THE

JOURNAL

OF

THE LINNEAN SOCIETY.

BOTANY.

VOL. XV.

EDITED BY DR. JAMES MURIE, F.L.S., F.G.S., F.Z.S., ETC.

LONDON:
SOLD AT THE SOCIETY'S APARTMENTS, BURLINGTON HOUSE;
AND BY
LONGMANS, GREEN, READER, AND DYER,
AND
WILLIAMS AND NORGATE.
1877.

SHOUT
SHARE
IT

Dates of Publication of the several Numbers included in this Volume.

No.	81,	pp.	1–40,	was published	October 11,	1875.
,,	82,	,,	40–90,	,,	March 3,	1876.
,,	83,	,,	90–159,	,,	May 11,	,,
,,	84,	,,	159–252,	,,	July 11,	,,
,,	85,	,,	253–363,	,,	September 14,	,,
,,	86,	,,	363–422,	,,	October 23,	,,
,,	87,	,,	423–480,	,,	December 15,	,,
,,	88,	,,	481–548,	,,	February 28,	1877.

PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.

LIST OF PAPERS.

Page

Archer, William, Esq., F.R.S., M.R.I.A.
  Note on the Freshwater Algæ collected by H. N. Moseley, M.A., in Kerguelen's Land. (Communicated by J. D. Hooker, M.D., Pres. Roy. Soc.) 445

Baker, John Gilbert, Esq., F.L.S.
  On the Polynesian Ferns of the 'Challenger' Expedition.......... 104
  Revision of the Genera and Species of Anthericeæ and Eriospermeæ 253
  On a Collection of Ferns made by Mr. William Pool in the interior of Madagascar 411

Balfour, Isaac Bayley, D.Sc., F.L.S.
  Extract of a Letter from I. B. Balfour, Esq., Botanist to the Expedition to Rodriguez to observe the Transit of Venus; addressed to, and communicated by, Dr. Hooker 24
  On a new Genus of Turneraceæ from Rodriguez 159

Bentham, George, Esq., F.R.S., F.L.S., Vice-Pres. Linn. Soc.
  Notes on the Gamopetalous Orders belonging to the Campanulaceous and Oleaceous Groups 1
  On the Distribution of the Monocotyledonous Orders into Primary Groups, more especially in reference to the Australian Flora, with notes on some points of Terminology. (Plates VII.–IX.) 490

Berkeley, The Rev. M. J., M.A., F.L.S.
  Enumeration of Fungi collected during the Expedition of H.M.S. 'Challenger.' (Second Notice.) 48
  Report on the Fungi collected in Kerguelen's Land by the Rev. A. E. Eaton during the stay of the Transit-of-Venus Expedition of 1874–75 221

Page

BERKELEY, The Rev. M. J., and C. E. BROOME.
Supplement to the Enumeration of Fungi of Ceylon. (Plate II.) 82

BERKELEY, The Rev. M. J., and M. C. COOKE.
The Fungi of Brazil, including those collected by J. W. H. Trail, Esq., M.A., in 1874 363

BROOME, C. E., and The Rev. M. J. BERKELEY.
Supplement to the Enumeration of Fungi of Ceylon. (Plate II.) 82

CLARKE, C. B., Esq., F.L.S.
On *Edgaria*, a new Genus of Cucurbitaceæ. (With woodcuts.) 113
Botanic Notes from Darjeeling to Tonglo. (With woodcuts.) 116

CROMBIE, The Rev. JAMES M., F.L.S. &c.
Lichenes Capenses:—An Enumeration of the Lichens collected at the Cape of Good Hope by the Rev. A. Eaton during the Venus-transit Expedition in 1874 165
Lichenes Terræ Kergueleni:—An Enumeration of the Lichens collected in Kerguelen's Land by the Rev. A. E. Eaton during the Venus-transit Expedition in 1874–75 180
On the Lichens collected by Professor R. O. Cunningham in the Falkland Islands, Fuegia, Patagonia, and the Island of Chiloe, during the Voyage of H.M.S. 'Nassau,' 1867–69 222
Lichens collected by W. Pool, Esq., in Madagascar 940
Lichenes Insulæ Rodriguesii.—An Enumeration of the Lichens collected by Dr. I. B. Balfour in the Island of Rodriguez during the Venus-transit Expedition, 1874 431

Contributions to the Botany of H.M.S. 'Challenger':—
Numbers XXI. to XXXVII inclusive. Consult respectively ARCHER, XXXIV., p. 445; BAKER, XXXI., p. 104; BERKELEY, XXVI., p. 48; DICKIE, XXI.–XXV., pp. 40–47, XXXIII., p. 235, XXXV., p. 446, XXXVII., p. 486; MITTEN, XXIX., p. 59; MOSELEY, XXVII., p. 53, XXX., p. 73, XXXVI., p. 481; O'MEARA, XXVIII., p. 55; REICHENBACH, XXXII., p. 112.

COOKE, M. C., and The Rev. M. J. BERKELEY.
The Fungi of Brazil, including those collected by J. W. H. Trail, Esq., M.A., in 1874 363

Page

Darwin, Francis, Esq., M.B., F.L.S.

On the Glandular Bodies on *Acacia sphærocephala* and *Cecropia peltata* serving as food for Ants. With an Appendix on the Nectar-glands of the Common Brake Fern, *Pteris aquilina*. (Plate VI.) 398

Dickie, Professor George, M.A., M.D., F.L.S.

Notes on Algæ from the Island of Mangaia, South Pacific 30
Algæ collected by Mr. Moseley at Simon's Bay, Cape of Good Hope 40
(N.B. Title of this correct on wrapper, but at p. 40, XXI. of Contributions to the Botany of H.M.S. 'Challenger,' contains part title of Nos. XXII. to XXV. inclusive.)
Algæ collected by Mr. Moseley at Seal Island 41
Algæ collected by Mr. Moseley at Marion Island in 40 fathoms 42
Marine Algæ collected by Mr. Moseley at the Island of Kerguelen 43
Algæ collected by Mr. Moseley at Heard Island, 250 miles S. of Kerguelen 47
Notes on Algæ found at Kerguelen's Land by the Rev. A. E. Eaton 198
Algæ chiefly Polynesian: being Contributions to the Botany of H.M.S. 'Challenger' 235
Notes on Algæ collected by H. N. Moseley, M.A., of H.M.S. 'Challenger,' chiefly obtained in Torres Straits, Coasts of Japan, and Juan Fernandez 446
Supplemental Notes on Algæ collected by H. N. Moseley, M.A., of H.M.S. 'Challenger,' from various localities 486

Dyer, W. T. Thiselton, Esq., M.A., B.Sc., F.L.S., Assist. Director Roy. Gardens, Kew.

On the Plant yielding Latakia Tobacco (*vide* Corrigenda et Addenda, Lattakia) 246
On the Genus *Hoodia*, with a diagnosis of a new Species. (Pl. V. and one woodcut.) 248

Gammie, J., Esq.

Extract of a Letter from Mr. J. Gammie to Dr. Hooker [On spadix of *Ariscema speciosum*] 25

Gilbert, J. H., Ph.D., F.R.S., F.C.S.

Note on the Occurrence of "Fairy-Rings" 17

Horne, John, Esq., F.L.S.

Extract of a Letter addressed to Dr. Hooker by John Horne, Esq., F.L.S., Subdirector of the Botanic Gardens, dated Mauritius, 12 November, 1874. [On the Botany of the Seychelles.] 27

Page

King, G., Esq., M.B., F.L.S., Superintendent of Botanic Gardens, Calcutta.
Note on a Sport in *Paritium tricuspe*, G. Don 101

Kirk, John, M.D., F.L.S. (H.B.M. Consul, Zanzibar.)
Identification of the Modern Copal Tree (*Trachylobium Hornemannianum*) with that which yielded the Copal or Animi, now found in the earth on the East Coast of Africa, often where no copal-yielding trees now exist 234
Note on specimens of *Hibiscus* allied to *H. rosa-sinensis*, L., collected in E. Tropical Africa, with remarks by Prof. Oliver, (Woodcuts.) 478

Masters, Maxwell T., M.D., F.R.S., F.L.S.
Remarks on the "Superposed" Arrangement of the Flower .. 456

Mitten, William, Esq., A.L.S.
The Musci and Hepaticæ collected by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger' 59
A List of the Musci and Hepaticæ collected in Kerguelen's Land by the Rev. A. E. Eaton, M.A. 193

Moore, S. Le Marchant, Esq., F.L.S.
Occurrence of Staminal Pistillody in an Acanthad. (Plates III. & IV.) 86

Moseley, H. N., Esq., M.A., late Naturalist H.M.S. 'Challenger' Expedition.
Further Notes on the Plants of Kerguelen, with some remarks on the Insects. (In a letter addressed to Dr. Hooker, Pres.R.S.) 53
Notes on Plants collected and observed at the Admiralty Islands, March 3 to 10, 1875 73
Notes on the Flora of Marion Island. (Communicated by Prof. Oliver, F.R.S., F.L.S.) 481

Oliver, Prof. Daniel, F.R.S., F.L.S., Keeper of the Herbarium, Royal Gardens, Kew.
List of Plants collected in New Guinea by Dr. A. B. Meyer, sent to Kew December 1874 29
Enumeration of Plants collected by V. Lovett Cameron, Lieut. R.N., in the region about Lake Tanganyika 90
Note on a Collection of North-Celebes Plants made by Mr. Riedel of Gorontalo 97

Page

O'Meara, The Rev. E., M.A.

On the Diatomaceous Gatherings made at Kerguelen's Land by H. N. Moseley, M.A., H.M.S. 'Challenger.' (Communicated by Dr. Hooker, Pres.R.S., V.P.L.S.) (Plate I.) 55

Potts, T. H., Esq., F.L.S.

Habits of Filices observed about the Malvern Hills, near the Gorge of the Rakaia, Canterbury, New Zealand............ 423

Reichenbach, Prof. H. G.

On some Orchidaceæ collected by Mr. Moseley, of the 'Challenger' Expedition, in the Admiralty Islands, Ternate, and Cape York, one of which forms the type of a new section of the Genus *Dendrobium*. (Communicated by Prof. Oliver, F.R.S., F.L.S.) 112

Reinsch, Paul Frederick, Esq.

Species ac Genera nova Algarum aquæ dulcis quæ sunt inventa in Speciminibus in Expeditione Vener. transit. hieme 1874–75 in Insula Kerguelensi a clar. Eaton collectis. (Communicated by Dr. Hooker, C.B., Pres.R.S., F.L.S.) 205

Sorby, H. C., Esq., F.R.S., F.L.S., &c., Pres. Roy. Micros. Soc.

On the Characteristic Colouring-matters of the Red Groups of Algæ. (With woodcuts.) 34

Trimen Henry, Esq., M.B., F.L.S.

Note on *Boeëa Commersonii*, R. Br....................... 163

Vines, S. H., Esq., B.A., Fellow of Christ's College, Cambridge.

On the Digestive Ferment of *Nepenthes*. (Communicated by W. T. Thiselton Dyer, M.A., F.L.S., Assist. Director Roy. Gardens, Kew.) 427

EXPLANATION OF THE PLATES.

PLATE

I. DIATOMS.—Illustrations of new Marine and Freshwater Species from Kerguelen's Land as determined by the Rev. E. O'Meara.

II. FUNGI OF CEYLON.—*Alwisia bombarda* and *Actiniceps Thwaitesi*, and details of same figured as referred to in the Rev. M. J. Berkeley and Mr. C. E. Broome's paper.

III. & IV. WHITFIELDIA LATERITIA.—Various Views of Normal and Abnormal Flower of, to illustrate Mr. S. Le Marchant Moore's paper on Staminal Pistillody.

V. HOODIA and DECABELONE.—Gynostemium of Species of these Genera, viewed from above and in section, to illustrate Mr. W. T. T. Dyer's paper on the Genus *Hoodia*.

VI. GLANDULAR BODIES and NECTAR-GLANDS of *Acacia sphærocephala*, *Cecropia peltata*, and *Pteris aquilina*, illustrating Natural Appearance and Histology of these Organs according to Mr. Francis Darwin's researches thereon.

VII. XYRIS and ERIOCAULON.—Diagrammatic Illustrations of these Genera, showing the Homology of Perianth-segments &c., in illustration of Mr. Bentham's paper.

VIII. CYPERACEÆ.—Diagrams to represent the Homology of Parts of same in various Genera and Species as determined by Mr. Bentham.

IX. GRAMINEÆ.—Diagrams illustrating the Homology of their Parts in several Genera, according to Mr. G. Bentham's views.

CORRIGENDA ET ADDENDA.

Page 40, line 13 from top, No. XXI. contains part title of Nos. XXII. to XXV. inclusive, and should read as given correctly on wrapper, viz. "Algæ collected by H. N. Moseley, Esq., M.A., at Simon's Bay, Cape of Good Hope."

— 56, — 4 from top, *for* "Herd Island" *read* Heard Island.

— 163, — Mr. Trimen's paper was read in 1876, not 1875.

— 167, — 16 from bottom, "F. SUBCORNUTA" should be C. SUBCORNUTA.

— 170, — 12 from top, "F. MINOR" should be P. MINOR.

— 224, — 11 from top, "F. COSTATA" should be C. COSTATA.

— 224, — 10 from bottom, in LAMARKII" C has been omitted.

— 235, — 12 from bottom, add XXXIII., after "Contributions to the Botany of H.M.S. 'Challenger.'"

— 238, — 3 from top. The asterisk (*) attached to *Sargassum ilicifolium* refers to the two lower lines of p. 239, which ought to have formed a footnote on p. 238.

— 246, — 4 from top. The author of the paper states that Mr. Eldridge and Prof. Post, his correspondents and authorities for certain statements, gave the spelling Lattakia (probably the correct one), and not "Latakia," as usually adopted in this country.

— 445, — 17 from top. After "Communicated by" *delete* "Sir".

— 452, — 6 from bottom, *for* "MICRANTHUM" *read* MICRACANTHUM.

— 453, — 12 from top, the first "U" has dropped out in SCUTELLUM.

— 453, — 19 from bottom "CLIMACOSPHÆRIA" should be CLIMACOSPHENIA; and "MONILIGEEA" should be MONILIGERA.

— 454, — 2 from top "CÆSPITALIS" should be CÆSPITALUS.

— 454, — 13 from bottom, *for* "INSERTA" *read* INCERTA.

— 454, — 7 from bottom, the specific name "CONCIONA" should be CONCINNA.

THE JOURNAL

OF

THE LINNEAN SOCIETY.

Notes on the Gamopetalous Orders belonging to the Campanulaceous and Oleaceous Groups. By George Bentham, F.R.S.

[Read March 4, 1875.]

It is now more than thirty years since the volumes of the 'Prodromus' containing the above orders were published; and during that period the great additions made to our knowledge, especially of tropical vegetation, have in many instances required considerable modifications of their tribual as well as generic arrangement. I have endeavoured to carry this out in preparing them for the forthcoming part of our 'Genera Plantarum;' but there is much of detail respecting the reasons which have induced me sometimes to depart from the principles adopted by former monographists, which the limits of that work prevent me from there entering into, and which I should therefore be desirous of placing on record in the 'Journal of the Linnean Society.'

1. Campanulaceæ *and their allies.*

The orders constituting this generally recognized and well-defined group are usually reckoned as seven—Stylidieæ, Goodenovieæ, Brunoniaceæ, Lobeliaceæ, Cyphiaceæ, Campanulaceæ, and Sphenocleaceæ. They would appear to me to be more naturally and clearly defined if reduced to three—Stylidieæ, Goodenovieæ and Campanulaceæ; for the exceptional characters upon which *Brunonia, Cyphia,* and *Sphenoclea* have been isolated do not prove to be of more importance than those observable in several other small or monotypic genera, which no one has on that account proposed to separate; and the union of Lobeliaceæ with Campanulaceæ, often proposed and rarely distinctly objected to, appears to me to be a most natural one, as I shall presently endeavour to show.

With regard to Stylidieæ, having so recently worked them up for the Australian Flora, I have now no remarks to make with regard to the genera *Stylidium* and *Levenhookia*, almost exclusively Australian, and constituting the great bulk of the order.

I would only observe, as to the two small southern genera (*Forstera* and *Phyllachne*), that they were very well distinguished by Swartz in Schrader's Journal for 1799, and in the first volume of König and Sims's 'Annals of Botany.' Willdenow and, after him, Endlicher and De Candolle united them under the name of *Forstera*. F. Mueller in a recent number of his 'Fragmenta' adopts the same view, but proposes to substitute the name of *Phyllachne* for the generally received one of *Forstera*. In the 'Flora Australiensis' I had only to deal with a true *Forstera*, which I entered under that name. Dr. Hooker, for his series of Southern Floras, had to examine them both; but not having before him the fruit of the typical *Phyllachne*, he presumed that his predecessors were right in treating it as the same as that of *Forstera*, and maintained the two only as sections of one genus; but having received from New Zealand a new species with the habit of his section *Phyllachne*, but with the perfect fruit irreconcilable with that of *Forstera*, he therefore proposed it as a new genus under the name of *Holophyllum*. It is now, however, shown, both by specimens and by Hombron and Jaquinot's figures (under *Forstera*), that the original *Phyllachne* has not only the habit and inflorescence, but also the indehiscent fruit of *Holophyllum*, and forms with it a generic group which Swartz was fully justified in distinguishing from *Forstera*.

GOODENOVIEÆ, as the order was originally named by its founder, Robert Brown, or *Goodeniaceæ*, as they are styled by the modern advocates of monotony in the names of orders, are, as well as Stylideæ, almost exclusively Australian, and are worked up in detail in my Flora. On that occasion, having at my disposal a large proportion of original specimens described by De Vriese, I was fortunately enabled to clear up much of the extraordinary confusion exhibited in that botanist's monograph. I also there gave my reasons for following Brown in including *Brunonia* in the order, which, notwithstanding the anomalies of this monotypic genus, is so definitely characterizad by the indusium as to have no ambiguity in its circumscription. The homology of this indusium has been variously interpreted. R. Brown, in the then state of our acquaintance with the organs of other plants that might be compared with it, put the following queries (Trans. Linn. Soc. xii. 134) :—"Is this remarkable covering of the stigma merely a process of the apex of the style? or is it a part of distinct origin, though intimately cohering with the pistillum? On the latter supposition, may it not be considered as analogous to the glandular disk surrounding or covering the ovarium in other families? And in adopting the hypothesis I had formerly advanced (Trans. Linn. Soc. x. 159) respecting the nature of this disk in certain families, namely that it is composed of a series of modified stamina, has not the part in question a considerable resemblance in apparent origin and division to the stamina of the nearly related family Stylidiaceæ? To render this supposition somewhat less paradoxical, let the comparison be made, especially between the indusium of *Brunonia* and the imperfect antheræ in the female flowers of *Forstera*." All further observation, however, has tended rather to oppose than to confirm this supposition. Brown's idea of the conformity of the disk, scales, and stamens as alluded to in the passage above quoted, appears to have been founded, not so much on his own observation, as on Labillardière's having given the name of sterile stamens to the hypogynous glands or scales of *Cenarrhenes*, which glands, however, in fact give no indication of any structural or morphological analogy to stamens. It is very rarely indeed that the disk has been shown to be a rudimentary whorl of organs, whether a reduced remnant of extinct organs or a first development of new ones. It is, on the contrary, now generally admitted that whether peripetalous, as in the case of the ring of calycine glands or scales in many Apocyneæ and Asclepiadeæ, or peristaminal, as in some Polypetalous orders or genera, or, as is more frequently the case, truly perigynous, hypogynous, or epigynous, the disk is a mere outgrowth of the receptacle or summit of the floral pedicels, promoted probably in many instances by the attractions its secretions afford to insects and then a true nectary, possibly developed in others as a store of nutriment during the early stages of the young embryo, but seldom, if ever, independently organic. If on some occasions it shows a ring of lobes alternating with those of the andrœcium or other immediately external whorl, that is merely due to the pressure of that external whorl during its growth in the bud. That the indusium cannot well be a second abortive whorl of stamens is further proved by the consideration that that whorl of organs is always uniseriate in the whole Campanulaceous group of orders, and that that single series exists in a perfect state in Goodenovieæ in its usual position at the base of, or slightly adnate to the corolla; nor can we readily compare it with a disk, as that excrescence, when epigynous, is, I believe, always at the base, not at the summit of the style.

An analogy between the indusiums of Goodenovieæ and the ring of collecting-hairs observable in many Lobelieæ has often been distinctly brought forward or tacitly assumed even very lately, as by Sonder in the 'Flora Capensis' with regard to *Cyphia*, or by Asa Gray in his note on *Nemacladus* in our Journal (xiv. 28); but it was ably refuted by Brown when pointing out the important characters separating Goodenovieæ from Lobelieæ. These collecting-hairs are indeed in a ring below the stigma in many Lobelieæ and in some Campanuleæ; but in some of the former and most of the latter they are differently arranged, either covering the whole of the upper moiety of the style, or in longitudinal rows, or more or less unilateral, &c.; and in all cases they are entirely epidermal productions, whilst the indusium is a development of the substance itself of the style.

Lindley may have come much nearer the truth when he says (Veg. Kingd. 694) that it "is to be regarded as nothing more than a remarkable exaggeration of the rim which surrounds the stigmatic surface of Heathworts (Ericaceæ), and of the plates which cover the style of Cranesbills and Balsams (Geraniaceæ and Balsamineæ). It is, in fact, the free upper extremity of the carpellary leaves, distinct from that prolongation of the placenta which is named style and stigma." I cannot quite concur with the latter part of this proposition; for I should confine the term placenta to that substance which more or less lines the inner walls of the ovary-cells or protrudes from them and bears the ovules, and regard the whole style as the prolonged apex of the carpellary leaves, entire or variously lobed, or enlarged at the extremity and bearing the stigmatic surface either on the summit, or within, or on the margins of the lobes, or below them on the outside. And if, with Lindley, we may compare the indusium with the ring surrounding the stigma in Ericaceæ, we may perhaps still better compare it with the dilatation at the end of the style commonly called the stigma, in Apocyneæ and Asclepiadeæ, with this difference, that in the latter two orders the dilatation bears the stigmatic surface or spots on its outside, whilst the terminal bifid apiculus, sometimes forming a large beak into which the dilatation tapers, sometimes reduced to very small dimensions in the centre of the concave disk-like dilatation, is usually, if not always, inert, whilst in Goodenovieæ the concave dilatation or indusium is inert, and the small bifid apiculus in its centre is stigmatic. The same difference in the position of the stigmatic surface is observable in Heliotropieæ as compared with other Boragineæ: that the indusium is thus in fact the concave apex of the style may be further confirmed by the case of *Leschenaultia*, where it is more or less distinctly two-lobed, and the stigmatic surface, instead of being stipitate in the base of the cavity, lines the inside of one at least of the lobes, thus forming an approach to the ordinary bilamellate stigmas of a large number of Gamopetalæ.

In the CAMPANULACEÆ we have, as has often been proposed, reunited as tribes or suborders the two great groups of Lobelieæ and Campanuleæ. Together they form a determinate wholesur rounded on every side by a broad gap without any intermediate or ambiguous form. Their nearest neighbours are the above-mentioned Stylidieæ and Goodenovieæ; but besides the minor characters brought forward by Brown, it may be enough to observe that there is in Campanulaceæ no indication either of the singular consolidation of the filaments and style of the former, or of the indusium of the latter order. Between the tribes, however, there is no such definite line of distinction. At first sight, indeed, the irregular flowers and alternate anthers of Lobelieæ would seem to form together a good ordinal character to separate them from the regular flowers and free anthers of Campanuleæ; but though constant in the great majority of cases, there are various exceptions with different combinations. There are species of *Isotoma* and *Lobelia* where the obliquity of the corolla is very slight; and, on the other hand, in *Leptocodon* and several species of *Campanula* and *Phyteuma* it is very perceptible. At the most, indeed, the irregularity of Lobelieæ is but little more than obliquity. There is no tendency to the bilabiate æstivation or to the didynamy of the Personate orders; the equally valvate æstivation and the isomery of the stamens are constant, both in Lobelieæ and Campanuleæ; the structure of the pistil, fruit, and seed is the same in both tribes as to all essentials, and exhibits similar variations in both as to minor points.

There are three genera, *Cyphocarpus*, *Nemacladus*, and *Cyphia*, the two former from western extratropical America (south and north), the latter from South Africa, which have very decidedly the irregular corolla of Lobelieæ with the free anthers of Campanuleæ. We have for technical convenience placed them together in a small third tribe intermediate between the two others; but, strictly speaking, they may not perhaps form a truly natural group. In general character indicative of natural affinity, each one of the three may prove to be more nearly allied to some one belonging to one of the other tribes than to either of the two now associated with it; but yet the actually inserting them in those tribes would have interfered too much with a clear methodical exposition of the order to be admissible at present, besides that it is by no means certain that they have not a common connexion.

An elaborate and careful monograph of the tribe Campanuleæ was the first botanical publication of Alphonse De Candolle, and gave him at once a distinguished place amongst the followers of systematic botany, although that has never been his special branch of the science. He subsequently edited the whole group for the 'Prodromus;' and he may always be relied upon for accuracy of detail as far as his own observations went. If we have found it necessary to remodel some of his genera consisting chiefly or entirely of extra-European species, or to lower the systematic grade he had assigned to some of his groups, this is owing either to the additional lights thrown on the subject by subsequent discoveries, or, in the case of several Lobelieæ, to the too great reliance placed by him on the preceding observations and conclusions of Presl and Don (George Don, assisted, I believe, in many respects by his brother David), many of which are very loose and hasty.

The Lobelieæ, however, are exceedingly difficult to divide into definite genera. The most dissimilar groups often run into each other by almost insensible gradations. I have endeavoured to keep up all genera which appeared to be founded on more appreciable characters, such as the consistency and dehiscence of the fruit, the placentation of the ovary, the dorsal or ventral fissure of the corolla, the attachment of the stamens, &c. But I have felt obliged to leave the genus *Lobelia* itself a very large one, however heteromorphous it may appear at first sight. The St.-Helena *Trimeris*, the large tropical species which I have referred to the section *Rhynchopetalum*, the Central-American section *Homochilus*, the large scarlet North-American *Eulobeliæ*, and the small blue

South-African and other species, all retained as *Lobeliæ* by De Candolle and others, appear to me to differ more from each other in habit and character, than some of them do from the American *Tupæ*, or from the small South-African groups generically separated by De Candolle after Don and Presl, chiefly from the degree of irregularity or fissure of the corolla, which it is often impossible to define in words. Amongst the latter, however, I was at first disposed to maintain the genus *Parastranthus*, founded on two species with yellow flowers quite sessile, without the reversion which takes place generally in the tribe by the torsion of the pedicel; but to these two Sonder has added, as a third species, the *Lobelia leptocarpa*, DC., with shortly pedicellate blue flowers, in which, as far as I can judge from dried specimens, the reversion takes place in some flowers and not in others, thus quite invalidating the generic character. There are also, I believe, other cases of partial or variable reversion.

Lobelia Bergiana, Cham., under Presl's generic name *Grammatotheca*, had been associated by De Candolle with *Clintonia*, Dougl. (now *Downingia*), in a distinct tribe, with the remarkable character of a unilocular capsule with *two* parietal placentæ, but opening in *three* valves. To this tribe he gave the name of Clintonieæ, altered to Grammatotheceæ by A. Gray, who (Journ. Linn. Soc. xiv. 29) remarks on it as a second instance of Lobeliaceous genera related to each other found in the two distant localities California and South Africa. But all this is founded on the hasty erroneous observations of Presl, never since verified, as I pointed out (Fl. Austral. iv. 128). The only character the two plants have in common is the long narrow ovary and capsule, which occurs here and there in single species of other genera. *L.* (*Grammatotheca*) *Bergiana*, accurately figured in Delessert, Ic. Sel. v. t. 6, has the true fruit of a *Lobelia*, completely two-celled and opening at the apex in two short loculicidal valves between the calyx-lobes; and the only way I can account for Presl's singular error is from his having observed old empty capsules, which in their decay have split up longitudinally below the calyx-lobes, the walls of the cells separating from the dissepiments, which latter he must have mistaken for a third placentiferous valve. In *Downingia* the capsule remains closed at the apex, but really opens below the calyx-lobes in lateral slits for the emission of the seeds. As the walls of the capsule are made up of the pericarp and the adnate calyx-tube composed of five sepals, each with its midrib, the lateral dehiscence would naturally take place in the thinner spaces between those nerves or midribs, as is clearly shown in *Campanula*, where the thin part of the pericarp between the dissepiments coincides with the thin part of the calyx-tube between the nerves or ribs. In *Downingia*, however, the ovary, two-celled at an early stage, becomes one-celled by the drying up of the exceedingly thin dissepiment, and the two placentæ remain attached to the inner walls of the cavity, each one opposite the junction of two sepals. When the capsule at maturity has to split open between the sepals, four of them are held together in pairs by the adnate placentæ, and between these pairs there is on one side one slit, and on the other side the intervening odd sepal induces two slits, one on each side of it; and we have as the natural result three valves, two of them placentiferous and the third naked, as described. This is the only instance among Lobelieæ proper of the lateral dehiscence, which is also exemplified, but apparently in a single slit, in the Chilian *Cyphocarpus* among Cyphieæ, a genus otherwise allied in many respects to *Downingia*, and in a few genera of Campanuleæ, although there rather in short valves than in long slits, excepting, indeed, in *Githopsis*, an outlying member of Campanuleæ, as *Downingia* is of Lobelieæ, and connected with the latter in some measure in this respect as in native country.

In geographical distribution the Campanulaceæ may be reckoned, for the most part, amongst the herbaceous races of extratropical origin, and in this respect analogous to a large portion of the Compositæ. There is nothing also to oppose the idea of their early development having been contemporaneous with that of the Compositæ, although their subsequent progress has been so much more limited. But I confess myself quite unable to see any grounds for supposing, with Delpino, that Lobelieæ are the parents of Compositæ. Moreover, if the two orders had a common parent, it must have been a very remote one with a long-passed extinction of all the races which had formed the intermediate stages. The intervening gap which now separates them is too wide and deep. In the important point of the pistillary structure no genus or species of the tribe Lobelieæ or of the whole order of Campanulaceæ shows any approach to that which is so uniform in Compositæ; nor indeed does any of the whole group of Campanulaceous orders, unless it be some slight indication in one or two species of Goodenovieæ, the furthest removed from *Lobelia*. Turning it over again and again, I can discover no plausible foundation for Delpino's genealogical Table from *Lobelia* to *Artemisia*.

The present distribution of Campanulaceæ seems to indicate a southern origin for Lobelieæ and a northern one for Campanuleæ.

The southern extratropical or mountain-range of herbaceous Lobelieæ is extensive and varied. They are represented by identical genera, sections, or even species in South Africa and Australia (*Lobelia Bergiana*, *L. anceps*, and allies), or in Antarctic America, South-east Australia, and New Zealand (*Pratia*), and have established several minor more or less endemic groups gradually diverging from the common types in South Africa, Australia, and Extratropical America. From thence Lobelieæ appear to have spread in several distinct directions into and beyond the tropics, without any transverse northern connexion between the several lines, which may be traced as follows:—

First, and most abundantly, along the western mountain-ranges of America, where they have developed into the shrubby genera *Siphocampylus*, *Centropogon*, and *Burmeisteria*, of which nearly two hundred species are already known, all remaining endemic in the tropical or subtropical mountain-regions, with the single exception of the *Centropogon surinamensis*, which has generally spread over tropical America. Secondly into tall herbaceous true *Lobeliæ* with a wider general range, having formed, however, special groups of a more local character, such as the *Tupæ* of Chili, the *thapsoid* Brazilian species, the *Tylomia* of the West Indies, the *Homochili* of Mexico, the *Eulobeliæ* of extratropical North America. Thirdly, into the Pratioid genera *Hypsela*, *Lysipoma*, and *Rhizocephalum*, which have remained almost entirely confined within the South-American, Andine, or extratropical regions, the *Pratia hederacea* alone, the exact counterpart of the Himalayan *P. begoniæfolia*, having extended further into South Brazil. Fourthly, the southern *Hemipogon* group has maintained the typical characters in a few species thinly scattered over the range, chiefly in Mexico, but has also developed into endemic groups passing gradually into the Mexican *Heterotoma*, more abruptly into the north-western *Downingia*. The southern *Laurentia* is also very closely represented by the Mexican *L. ramosissima* and by the Californian *Porterella*, and the southern *Isotoma* by the West-Indian *Hippobroma*.

In the Old World the northern dispersion of the Lobelieæ appears to have been chiefly in the extreme east over the Indo-Australian region with much less of modification of their original southern character than in America. The Asiatic Lobelieæ have remained within the limits of the two widely spread genera *Pratia* and *Lobelia*, slightly modified as they enter or pass the tropics, in a manner corresponding to that observed in Brazil, but without any tendency to the marked endemic groups of Western America. Thus, in *Pratia*, the Himalayan *P. begoniæfolia* is, as above-mentioned, a close representative of the Brazilian *P. hederacea*. The *P. montana*, from the Archipelago and eastern provinces of India (*Spirema*, Hook. f. et Thoms.), is an endemic modification, but scarcely generic, diverging in habit, but much less in character than the New-Zealand *Colensoa*. The genus *Lobelia* itself has preserved much of the southern type in some species both of *Hemipogon* and *Holopogon*, but has also, by somewhat gradual modifications, developed in considerable variety the tall herbaceous *Rhynchopetalum* forms, sometimes nearly counterparts of the Brazilian thapsoid species, and ranging across the Asiatic continent and to the islands of the China seas.

There has also been some extension of the tribe northwards along the extreme west of the Old World: one or two representatives of South-African types (*Laurentia Michelii*, DC., and *L. tenella*, DC.) are now very rare in the Mediterranean region; another (*L. urens*) extends along Western France to Britain, but has been unable to penetrate eastward. From this *L. urens* in the extreme west of Europe to the *L. sessilifolia* in the extreme east of Asia, a continuous expanse of land nearly half encircling the globe, there is not to the north of the great Alpine Caucasian and Himalayan line a single trace of the tribe.

L. Dortmanni, an aquatic species of North-western Europe, may, like the *Eriocaulon* and others, have come over from North America. With regard to the *Lobeliæ* of the *Rhynchopetalum* group in tropical Africa we have not sufficient data to form any opinion as to their origin. They are perhaps more likely to be slightly modified Asiatic species than endemic developments of the more distant South-African forms.

Lobelieæ must also have found their way very early to the distant islands of the Atlantic and Pacific; for they have there generated special endemic forms with the usual insular character of a ligneous development of races more generally herbaceous. Thus they have produced the *Trimeris* (*Lobeliæ* sect.)

of St. Helena, the *Sclerotheca* of the Society Islands, and the five genera constituting the *Clermontia* group of the Sandwich Islands.

In regard to geographical distribution, the Cyphieæ may be included in Lobelieæ, to which they are otherwise more nearly allied than to the Campanuleæ. Of the three genera, the principal one, *Cyphia*, is entirely South African, one species only having reached Abyssinia; the monotypic *Cyphianthus*, from Chili, and *Nemacladus*, from North-west America, have followed the course of other races of southern origin, travelling northwards along the western regions of America.

We now come to the Campanuleæ, whose development appears to have been chiefly *northern* in the Old World, whilst the Lobelieæ had been generally *southern*. The union of the two in one very natural and well-defined order would indicate a common origin; but what that parent race was, or what was its primitive home, is, I believe, with our present data, beyond the reach of conjecture. All we might venture to imagine appears to be:—

That the primitive race flourished very early in some region in connexion with Africa.

That the Lobelieæ were first developed at a time when the geological or other conditions afforded some general means of southern communication between South Africa and Australia, between Australia, New Zealand, and Antarctic America, between South Africa and extratropical South America.

That when the Campanuleæ were differentiated, South Africa was already isolated from the rest of the southern hemisphere.

That this branch of the descendants of the primitive race having then become established in the African region, both to the north and to the south of the hot zone, developed freely, extended widely, and became much varied in the wide area opened to it in the north, but remained much more restricted in numbers and variations in the limited space allowed it in the south.

That it spread very sparingly over the tropics, with but little variation, and was still more restricted in crossing the tropics southward at a distance from the primitive home.

Such are the principal conjectures which suggest themselves on the consideration of the present distribution of the tribe of which the following is a general sketch.

We may perhaps be justified in taking as the earliest forms in which Campanuleæ were developed those genera in which the capsular dehiscence is normal in terminal valves, especially *Wahlenbergia*. This is now the most widely spread genus, being almost cosmopolitan. It is especially abundant in South Africa, where it passes gradually into the closely allied genera *Lightfootia* and *Microcodon*. It does not scorn the tropics, where it has generated the two or three species of the closely allied *Cephalostigma*. In the north, besides one almost cosmopolitan species, it takes the rather distinct forms of the *W. hederacea* in Western Europe and the several *Edrianthi* of the East Mediterranean region. It has spread over Asia, passing into the Chino-Japanese *Platycodon*; and one Indo-Australian form has extended southwards to New Zealand, where is also a peculiar endemic species, more nearly connected, however, with the Asiatic than with any other forms. It has also found its way, with other early races, to some of the distant islands, characteristic shrubby forms being found in Saint Helena and in Juan Fernandez. In America it is only to be met with in the tropics, but very sparingly, and not in any peculiar endemic form. The European *Jasione*, though a very distinct type, may be considered also as one of the *Wahlenbergia* group. And diverging from it, but in a different direction and in a greater degree, are the three Himalayan genera *Leptocodon*, *Codonopsis*, and *Cyananthus*. Although the latter genus, on account of its trimerous ovary being superior or nearly so, had been originally referred to Polemoniaceæ, I cannot see any real affinity with that order. The three genera are closely allied to each other, and appear to me to be the result of a differentiation, diverging from the *Wahlenbergia* group, which has not gone further, and not the remains of the extinct races which had intervened between Campanulaceæ and any other order.

Four small genera of Campanuleæ, with indehiscent fruits baccate or nearly so, are exclusively northern, though not so extratropical as most of the others. *Canarina*, a single Canary-island species, is nearly allied to some of the five East-Asiatic species of *Campanumæa*; and these, again, are connected in some measure with the *Wahlenbergia* group through the above-mentioned *Codonopsis*. But the Himalayan *Peracarpa*, a single species, and *Pentaphragma*, from the Malayan archipelago, with three species, are quite isolated, showing no connexion with each other or with any other genus, except the general one with the tribe. The intermediate races which might have shown their special derivation are lost to us.

The Campanuleæ in which the capsular valves remain closed and consolidated into a coriaceous or hardened, flat or convex, apex, are numerous, and distributed into a number of more or less distinct genera both in the northern and in the southern (South-African) extratropical regions; but the means of escape provided for the seeds are quite different in the two regions. In the genera *Roella*, *Prismatocarpus*, *Treichelia*, *Siphocodon*, and *Merciera*, all confined to South Africa, either the hardened apex comes off bodily by a horizontal separation within or below the calyx-limb, or the capsule opens below the calyx-limb in longitudinal fissures, or (in *Merciera*) never opens at all. On the other hand, in the great northern genera, chiefly Mediterranean, but some of them extending all over Europe, central and northern Asia, and thence to North America, *Campanula*, *Specularia*, *Phyteuma*, and the more restricted *Adenophora*, *Symphiandra*, *Michauxia*, *Musschia*, and *Trachelium* the dehiscence is peculiar. A small orbicular or oblong portion of the pericarp below the calyx-limb and between each two ribs separates in the form of a little valve, leaving a pore or hole for the escape of the seeds; or (in *Musschia*) a number of transverse slits are opened without any separable valve. This mode of dehiscence, unknown in South Africa, must have had an exclusively northern origin and development; whilst the southern opercular or longitudinal dehiscences have never reached Europe or extratropical Asia.

Sphenoclea, a tropical weed common to both the New and the Old World, is a very marked form of uncertain parentage. It has, indeed, so little direct connexion with any one Campanulaceous genus that it has been raised by some to the rank of a distinct order, although there is no character which it has not in common with some portion of the tribe Campanuleæ. It is most probably of African origin; and the capsule has the opercular dehiscence of some of the South-African genera.

The several species of Campanuleæ endemic in North America are chiefly slight modifications of the widely spread northern Old-World genus *Campanula*, or of its close ally or subordinate genus *Specularia*. One species of the latter has spread far down the Andine range of South America, where it has even formed some slightly differentiated local races, varieties sometimes dignified with the title of species. There is, however, one monotypic Californian genus (*Githopsis*), the origin and connexions of which are as yet very problematical. It is a small annual of limited area, with the capsule operculate, as in some of the above-mentioned South-African Campanuleæ, with which it cannot be supposed to have any connexion. The character, however, is exemplified in West America in some Lobelieæ—a circumstance which, taken together with the habit, might lead us to suppose that notwithstanding its free anthers, *Githopsis* is rather derived from the Lobelieæ than from the Campanuleæ, with which it is technically classed.

2. Oleaceæ *and* Salvadoraceæ.

Following the suggestions of Endlicher and others, we have reunited the Jasmineæ and Oleineæ, so many of the supposed distinctive characters having become invalidated by further observation; and we long hesitated whether the Salvadoraceæ should not also have been brought in. The whole together form an isolated and well-defined group, divisible into five, of nearly, though not quite, equal value—Jasmineæ, Syringeæ, Fraxineæ, Oleineæ, and Salvadoraceæ. The connecting link of the whole, independently of a number of minor less-constant characters, is the binary arrangement of the stamens in continuation of that of the carpels, and independent of that of the corolline lobes. This is strikingly exemplified in the Jasmineæ and in *Schrebera*, where the corolline lobes vary from the ordinary four to five, six, or more. Lindley observes, indeed (Veg. Kingd. 618), that the two stamens of Jasmineæ are probably connected with a quinary type; but that does not prove to be the case. In the Personate orders, where the stamens are reduced to two, it is always by the abortion of the remainder of the whorl, of which the rudiments may most frequently be traced; and the two perfect ones are always alternate with the lobes of the corolla. In Jasmineæ and in *Schrebera* I have invariably found them, as in other Oleaceæ, alternating with the carpels and bearing no relation to the corolla-lobes. This is further proved by two or three flowers in which I found three carpels, and in which there were also three stamens, without any corresponding difference in the corolla-lobes. In the Salvadoraceæ and in the very few species of Oleaceæ (about half a dozen out of 280), where the second series of stamens is developed, the four stamens do, it is true, alternate with the four petals; but this isomery is only a further continuation of the binary arrangement from the pistil outwards.

I know of no order with which the Oleaceous group is immediately connected beyond the gereral affinity to bicarpellary Gamopetalæ, nor am I aware of any ambiguous or connecting genus.

Of the five subordinate groups, the Salvadoraceæ are certainly the most distinct, although they have no one constant character which is not to be found in some genus of the other groups, except perhaps the rudimentary stipules, of which there is, I believe, no trace in any Oleaceæ. The glandular scales behind the stamens of *Dobera*, and sometimes of *Salvadora*, have no existence in Oleaceæ, but are not constant in Salvadoraceæ. The stamens are always four, as in one or two species of each of three genera of Oleaceæ; the radicle is inferior, as in Jasmineæ; the general resemblance more with Oleineæ.

Jasmineæ, as well as Salvadoraceæ, are frequently treated as a separate order, the distinctive characters usually given being an increased number in the parts of the corolla, a didymous fruit, exalbuminous seeds, and an inferior radicle. But the increase in the number of corolla-parts occurs also in *Schrebera*, with the loculicidal capsule and inferior radicle of Syringeæ; the fruit is not didymous in *Nyctanthes*, which in all other respects is a true Jasminea; there is no albumen in *Schrebera* among Syringeæ, nor in *Noronhea* among Oleineæ; and in *Linociera* the albuminous and exalbuminous species are sometimes most closely allied in all other respects. There remains the inferior radicle; but even this character may not be here considered in the same light as in the case of Boragineæ and Verbenaceæ. The ovules are in all Oleaceæ, as far as I have observed, anatropous and laterally attached; and in the seed the radicle, always next the hilum, becomes inferior when the seed is erect, superior when it is pendulous. On the other hand, the radicle is always superior in Boragineæ, and inferior in Verbenaceæ, whatever be the position of the hilums. The climbing habit of many *Jasmina* does not extend to *Menodora* or *Nyctanthes*, and occurs in *Myxopyrum* among Oleineæ. The dissected leaves are also found in *Fraxinus*, and sometimes in *Schrebera* and *Syringa*.

The three remaining subordinate groups or tribes are distinguished chiefly by their fruit—capsular and loculicidally dehiscent in Syringeæ, samaroid, winged and indehiscent in Fraxineæ, baccate or drupaceous and indehiscent in Oleineæ. The presence or absence, the freedom or union, and the varied æstivation of the parts of the corolla afford generic, but no tribual characters.

Geographical distribution does not coincide with tribual differences. *Jasminum*, *Nyctanthes*, *Schrebera*, *Olea*, and *Myxopyrum* belong to the tropical or subtropical regions of the Old World, very sparingly extending into more temperate climates; *Linociera*, also tropical or subtropical, extends nearly equally over America and the Old World. *Syringa*, *Fontanesia*, *Phillyrea*, and *Ligustrum* are from the northern extratropical districts of the Old World, the first three almost limited to the Mediterranean region; *Ligustrum* is also European, but is more abundant in East Asia, whence it has even stretched across the tropics to Australia. *Osmanthus* and *Chionanthus* are common to eastern Asia and North America. *Fraxinus* extends all round tbe northern extratropical zone both in America and in the Old World. *Forestiera* is the only genus exclusively American, and is chiefly tropical or subtropical. *Menodora*, as marked a genus in distribution as in other respects, is the only one showing a more southern character. It belongs to a series of genera which at the present period are represented at once in South Africa, in extratropical South-American, and in the Mexicano-Texan region of North America.

There remain two small genera, both of them slight modificaof the tropical *Linociera*—one, *Notelæa*, represented in the Canary Islands and in Australia, the other, *Noronhea*, limited to the Mascarene Islands.

The Salvadoraceæ, like some of their Oleaceous allies, appear to have had their origin in the East tropical African or Africano-Indian region, having extended northwards as far as Persia, southwards to the Cape, and eastwards, though sparingly, to the Malayan archipelago.

Note on the Occurrence of "Fairy-Rings."

By J. H. Gilbert, Ph.D., F.R.S., F.C.S.

[Read June 3, 1875.]

It is known that "Fairy-Rings" occur chiefly, though not exclusively, on poor pastures, and that they are discouraged by high (especially high nitrogenous) manuring. In the experiments on permanent meadow-land, conducted in Mr. Lawes's Park at Rothamsted, there are twenty different plots, representing nearly as many different conditions of manuring, the same condition having been continued on the same plot in most cases for twenty years in succession. Some of these plots yield an average of little more than 1 ton of hay per acre, and others more than 3 tons. On some "fairy-rings" occur, whilst on others they do not. The flora generally, so to speak, has, indeed, changed under the influence of the different manures in a very striking degree. Thus, speaking roughly, there are certain plots on which there develop annually from 40 to 50 species or more, whilst in others even less than 20 are in some seasons found. These differences, it should be remarked, are the result of the different conditions as to manuring, the whole area, so far as could be judged, having been pretty uniform in the character of the herbage at the commencement of the experiments.

It will be of interest, and be found not irrelevant to the special subject of this communication, to summarize as briefly as possible a few of the most characteristic changes which have taken place in the botanical character of the vegetation under the influence of certain characteristic conditions as to manuring. On three occasions, at intervals of five years (namely, in 1862, 1867, and 1872), a sample of the produce from each plot has been carefully taken and submitted to careful botanical analysis. Taking the average of the three separations, the following are some of the results:—

Continuously without manure (plots 3 and 12), the number of species found in the produce has averaged 48, of which 17 are grasses, 4 belong to the order of Leguminosæ, and 27 to other orders. The percentage by weight of grasses is about 62, that of the leguminous herbage 8, and that of the remaining species, which it will be convenient to term *miscellaneous* herbage, 30.

With a purely mineral manure, containing superphosphate of lime and sulphates of potass, soda, and magnesia, but no nitrogen or organic matter (plot 7), the average number of species found has been 42, of which, as without manure, 17 are grasses, 4 Leguminosæ, and the remainder "miscellaneous." But the produce has contained, on the average, only 55 instead of 62 per cent. of its weight of grasses, nearly 26 instead of only 8 per cent. (as without manure) of Leguminosæ, and only 19 instead of 30 per cent. of "miscellaneous" herbage.

With the same mineral manure as on the last plot (7), but with the addition of a large quantity of ammonia-salts, in plot 11, the average number of species found has been reduced to 21, of which 13 are grasses, 1 only belongs to the order of Leguminosæ, and 7 to other orders. But instead of 62 per cent. by weight of graminaceous herbage, as without manure, or 55 per cent., as with the mineral manure alone, we have now, with this mixture of the same mineral manure and a great excess of ammonia-salts, 92·5 per cent. by weight of grasses, only 0·01 per cent. of leguminous herbage, instead of 8 per cent. as without manure, and 26 per cent. with the purely mineral manure; and we have less than 7½ per cent. of species from other orders, instead of about 30 per cent. as without manure, or 19 as with the purely mineral manure.

It will be readily understood that, with the great variety of manurial conditions offered by the twenty different experimental plots, there is very great variety in the development and relative predominance of the representatives of different orders and genera intermediate between the marked extremes above referred to. With reference to the extreme cases cited, the prominent point to observe is, that the grasses dominate to an extraordinary degree where large quantities of ammonia as well as mineral manure were employed, whilst, under these conditions, the leguminous herbage was all but annihilated, and the "miscellaneous" species were very much reduced both in number and in weight per cent. in the produce. On the other hand, the percentage proportion and the actual quantity of the leguminous herbage was enormously increased by a mineral manure containing potass but no ammonia, or nitrogen in any other form, or organic matter of any kind.

Here is obviously a remarkable instance of domination under well-defined artificially induced conditions. But the facts are the more remarkable since it is the Graminaceous herbage (which under equal conditions of ripeness contains a comparatively low percentage of nitrogen) that is so strikingly developed under the influence of nitrogenous manures; whilst the Leguminous herbage, which is characterized by a very high percentage of nitrogen, is specially developed by mineral manure containing potass; and when to this nitrogenous manures (especially ammoniacal) are added, the plants of the Leguminous order are almost abolished.

These striking results, brought out in experiments on the mixed herbage of grass-land, are moreover perfectly consistent with those observed in the growth of individual Graminaceous and Leguminous crops in rotation on arable land. Thus, a crop of wheat, barley, or oats is, other things being equal, very much increased by nitrogenous manures. A crop of clover or beans, on the other hand, although it may yield three, four, or five times as much nitrogen over a given area, as a crop of wheat, barley, or oats growing on the same description of land, is not characteristically benefited by direct nitrogenous manures. But these Leguminous plants will develop and assimilate an enormous amount of nitrogen under conditions in which the Graminaceæ would languish, and they at the same time leave the land in improved condition for the growth of the Graminaceæ. It must be admitted that the source of the much larger quantity of nitrogen assimilated over a given area by plants of the Leguminous than of the Graminaceous family, and of the residue of it left by them in the upper layers of the soil in a condition available for the Graminaceæ, is not yet conclusively explained.

Reflecting upon these facts, Mr. Lawes and myself have often felt that if we could determine the source of the nitrogen of the fungi growing in "fairy-rings," some light might perhaps be thrown on the question of the source of the nitrogen of the Leguminosæ which we cultivate separately in rotation, or which grow in association in the mixed herbage of grass-land.

It will be readily understood that the nearly twenty conditions as to manuring, and the as many different conditions as to flora, which the experimental plots in the Park at Rothamsted offer, afford an extremely favourable opportunity for observing the conditions, both as to manure and association, under which fungi, and especially those occurring in the so-called "*fairy-rings,*" most readily develop. Accordingly for some time past Mr. Lawes has observed their occurrence and development; and it is the results of his observations on these points that I am enabled to communicate.

Before stating under which of the conditions of manuring "fairy-rings" have most developed, it is of interest to observe that, according to published analyses of various fungi, generally from one fourth to one third of their dry substance consists of nitrogenous matters. The dry substance further generally contains from 8 to 10 per cent. of mineral matter or ash, of which about 80 per cent. is phosphate of potassium. In fact, fungi would appear to be among the most highly nitrogenous of plants, and to be also very rich in potass. Yet the fungi have developed in "fairy-rings" only on the plots poorest in nitrogen and potass in such conditions as to be available to most other plants.

To go a little further into detail:—

In November 1874 six species of fungi were observed on the unmanured plot (3), where also they were more abundant than on any other plot. They were named by the Rev. M. J. Berkeley as follows—*Boletus erythropus*, *Hygrophorus pratensis*, *H. coccineus*, *H. virgineus*, *Agaricus geotrupus*, *A. æruginosus*.

On the plot with superphosphate of lime alone (4 . 1) there were two species, namely *Hygrophorus coccineus* and *Clavaria vermicularis*.

On plot 8, with superphosphate of lime and sulphates of soda and magnesia, but without potass for fourteen years, two species, *Hygrophorus virgineus* and *Agaricus nudus*.

On plot 17, with nitrate of soda alone, small patches of *Hygrophorus virgineus* and of *Agaricus furfuraceus* were found. On plot 16, with nitrate of soda and sulphates of potass, soda, and magnesia, a few of *Hygrophorus virgineus*. And on one or two other plots there were individual specimens of *Agaricus arvensis* of very large size.

"Fairy-rings" occurred almost exclusively on plot 4 . 1 (with superphosphate of lime alone), and on plot 8 (with superphosphate of lime, and sulphates of soda and magnesia, but no potass).

In May 1875 only one species, namely *Marasmius oreadum*, was observed.

On the 19th there were comparatively few specimens to be found. On the 31st they occurred in small numbers on plot 1 (with farm-yard manure and ammonia salts 1856–1863, but since ammonia salts only), on plot 2 (with farm-yard manure alone 1856–

1863, but since unmanured), on plot 3 (unmanured for more than twenty years), and on plot 7 (with superphosphate of lime and sulphates of potass, soda, and magnesia for twenty years). On plots 4 . 1 and 8, on the other hand, they could be counted by hundreds ; and on these two plots only were they found in "fairy-rings."

On plot 4 . 1 (with superphosphate of lime alone) there were six more or less complete "fairy-rings," on some of which hundreds of the fungi were growing in thick patches, generally surrounded by the very luxuriant grass of the ring.

On plot 8 (with superphosphate of lime and sulphates of soda and magnesia but no potass for fourteen years) there were three large "fairy-rings" with the fungi growing very thickly on them, the grass of the rings being also very luxuriant. There were, besides these rings, a number of patches down one side of the plot showing many of the fungi and very luxuriant grass; and there was one large patch of very luxuriant grass showing no fungi now, nor was mycelium found in the soil; but in the autumn this patch gave a crop of *Agaricus nudus*. On this plot especially the increased growth of grass on the rings and patches where fungi have occurred is so considerable that it must appreciably affect the amount of produce on the plot; and the grasses most favoured seem to be *Poa trivialis* and *Holcus lanatus*.

Thus, then, the highly nitrogenous fungi flourished strikingly, and appeared in "fairy-rings," on two plots only, on neither of which is either nitrogen or potass applied as manure—conditions under which the development of the Graminaceæ is extremely restricted, and their limited growth is due to a deficient available supply of nitrogen, or of potass, or of both, and where the competition of the Leguminosæ is also weak, in the absence of a more liberal supply of potass.

The questions obviously arise whether the greater prevalence of fungi under such conditions be due to the manurial conditions themselves being directly favourable for their growth, or whether other plants, and especially the grasses, growing so sluggishly under such conditions, the plants of the lower orders are the better able to overcome the competition and to assert themselves. On this point the further questions arise whether the fungi prevail simply in virtue of the absence of adverse and vigorous competition, or whether to a greater or less extent as parasites, and so at the expense of the sluggish underground growth of the plants in association with them; or, lastly, have these plants the power of assimilating nitrogen in some form from the atmosphere, or in some form or condition of distribution within the soil not available (at least when in competition) to the plants growing in association with them?

It is with the hope of arriving at some answer to these questions, either from the existing knowledge or the future observation of botanists and vegetable-physiologists, that we have felt it desirable to comply with the request made to us, to bring our own observations, made from a special point of view, before the Fellows of the Linnean Society. In aid of this object it may be well to state some other facts which we have noticed in connexion with the formation and extension of "fairy-rings."

It is probable that the fungi growing on meadow-land owe their occurrence in the first instance to the accidental droppings of animals or birds. Individual specimens appear, and sometimes grow to a large size, even on some of the highly manured plots; but patches, or "rings," are chiefly found on the poorly manured or exhausted plots—that is to say, where there is a marked absence of luxuriance in the vegetation generally. So far as may be judged from observation hitherto, patches may form and die out without development and extension into "rings." The formation of an annually increasing "ring" seems to require special conditions, both as to soil and association. In the case of mere patches, some examinations of the soil in spring and autumn have not shown a marked development of mycelium where it would be expected if there were to be extension, though it would appear that, if the conditions be specially favourable, they may enlarge and endure for some time. In the case of extending "rings," on the other hand, the soil under the outer portion of the circle generally shows, to a depth of a foot or more, according the character of the soil, an enormous development of mycelium for some time prior to the appearance of the above-ground growth.

It is to be particularly observed that this development of mycelium is always under the *outer* portion of the "ring," and is not found within it. When a ring is formed, what happens seems to be the following:—From some extraneous cause, such as above referred to, a patch of fungi is established. The plants falling and dying supply a rich nitrogenous (as well as mineral) manuring to the adjacent herbage. A patch of dark green luxuriant grass, generally several inches higher than the surrounding herbage, succeeds. This being cut or eaten off, the soil may sooner or later become even more exhausted than before; and it is accordingly frequently observed that the grass within is less luxuriant than that outside the ring. Initiative experiments, upon which, however, we would not place implicit reliance, have, indeed, shown a lower percentage of nitrogen in the surface soil within the circle than at an equal depth either under or without the circle. Leguminous plants are not excluded from the area within the ring; but whilst *Lathyrus pratensis* and *Trifolium pratense*, plants which on the land in question have shown themselves very dependent on artificial supplies of potass, seem to be discouraged, *Lotus corniculatus* and *Trifolium repens*, species which maintain their position under marked conditions of exhaustion of soil, are fairly abundant. At any rate, it would appear that, in the case of "rings," the soil underneath the fungus-growth has become unfitted to support another crop, or successive crops, of fungi. Accordingly, supposing the soil of the plot to be favourable, the ring develops always outwards—that is, on what is to the fungi virgin soil; and hence the annual enlargement.

It will be seen that in these facts we have an interesting illustration of what may be called natural rotation. The original fungi probably receive their nutriment from extraneous sources; but once established, they must, for the extension into "rings," depend upon other supplies, which, if due to the soil itself, are obviously unfavourable, either in condition or in distribution, to the surrounding vegetation, and especially to the grasses, which do not flourish until the matter taken up by the fungi becomes available to them as manure, when at once they show very great luxuriance. Or is it, as already suggested, that the mycelium develops, so far as its nitrogen is concerned, not at the expense of that which may be said to have become a constituent of the soil itself, but of that accumulated in the vegetable débris from former growth within the soil, or even parasitically—that is, at the expense of the nitrogenous matters of the roots of not dead but very sluggish vegetation?

These points are obviously of very considerable interest from both a chemical and a physiological point of view; and it is much to be hoped that botanists and vegetable physiologists who may have special knowledge on the subject will bring it to bear on the questions which seem to be at issue—or that, in so far as such knowledge is not yet available, some may be induced to take up the investigation with a view to the elucidation of that which, to us at least, seems to require explanation *.

Extract from a Letter from I. B. BALFOUR, Esq., Botanist to the Expedition to Rodriguez to observe the Transit of Venus; addressed to, and communicated by, Dr. HOOKER, F.L.S.

[Read May 7, 1874.]

I HAVE done a good deal of work since I came here, and have explored the major part of the island. It is only 10¼ miles long by 4 miles broad, much smaller than previously supposed; but the huge boulders and stones which cover the ground over the whole island render walking both difficult and dangerous.

The flora is by no means extensive; and it is curious to note how very restricted in area are the habitats of many of the plants. In several cases the plant from which I have gathered my specimen was the only individual of the species which I have seen in the island.

I do not know enough about the Mauritian flora to make any comparison; but several of the ferns which I have seen seem to be identical with Mauritian ones.

The Vacoas (*Pandani*) are extremely puzzling. The inhabitants say that there are four kinds, calling them *Vacoa sac*, *V. poteau*, *V. chevron*, and *V. parasol*; others make five, adding *V. mâle*; whilst others, again, substitute a *V. calé* for the *V. sac* and *V. parasol*. For my part, I think at present the *V. poteau* and *V. chevron* are the only two species, the former growing on the shore and also on the hills, the latter only on the hills. The *V. sac* is just the young plant of the *V. poteau* with large leaves; the *V. mâle* is merely the male tree of either of the species; and the *V. parasol* seems to be nothing but the *V. poteau* growing where it has free scope to develop its branches regularly and form a dome, the *V. calé* being a dwarfed stunted form of *V. poteau* when exposed to wind &c. The fruits of all those trees which I would group under *V. poteau* vary very greatly, both in size, colour, and form; but the habits of the trees are quite the same. These are at present my ideas regarding them; but I intend devoting a great deal more time to them.

---

* Owing to pressure of occupation at the time, I was not able to refer to the opinions of others before writing the foregoing notes, but have since done so, and would call attention to the observations of Berkeley, Way, Buckman, Lees, and others,—J. H. G.

The Palmistes (Palms) here are two in number: one, the *Palmiste bon*, is, I believe, the same as one growing in Mauritius; it has a long, thin, straight, tapering stem; the other, called here *Palmiste marron*, is very clearly and easily distinguished from it; its stem, at first thin, gradually thickens, and then tapers at the summit, so that it has a thick bulged part in the middle. The flowering spike is different, as well as the leaves; and, further, whilst the *Palmiste bon* makes an excellent salad, this species, if eaten, is apt to poison. There is only one species of Latanier Palm, which is, I believe, similar to one found in Mauritius.

I have not sent any specimens of plants or rocks by this mail, as I have not got all the necessary packing-materials here; I shall, however, despatch them as soon as I return to Mauritius.

Rodriguez, November 3, 1874.

Extract from a Letter from Mr. J. Gammie to Dr. Hooker.

[Read February 4, 1875.]

Dear Sir,— * * *

Some time ago you asked me to find out the use of the thread-like appendage to the spadix of *Ariscema speciosum*. It has lately been in flower; and I have examined hundreds of them, but can come to no satisfactory conclusion. Your own surmise, that the appendage is a sort of gangway to lead wingless insects from spadix to spadix, may be the correct explanation; but I did not see an insect of any description crawling along any one of them, and, with the exception of a solitary spider, I found no insects inside the spathe. The spider had spun a web across the mouth of the spathe as though it expected visitors; and as spiders are not in the habit of making webs for show merely, I suppose insects do visit the flowers. I was much struck with the excess of the male over the female inflorescences; and on counting in many different places I found about ten spadices of the former to one of the latter. At first I thought that the spadix-thread might be to keep the flaccid end of the spathe from falling down and closing up the mouth. The leaf and flower-stalks come up together with the thread hitched in between the leaflets. Afterwards, when the leaf-stalk rises beyond the peduncle, the thread becomes tolerably tight, with the end of the spathe leaning against it. The first breeze, however, often blows the thread to the ground; so that there is little chance of this being its intended function. Some Lepchas told Dr. Henderson that the thread took hold of the ground and produced a tuber; but I am quite certain that there is not the shadow of a foundation for this assertion. I found, in my searching, another species, which I had up to that time quite overlooked. It is much larger than *A. speciosum*, and has leaflets about 15 inches across, with conspicuous light-coloured midribs *. The spathe is also much larger, and has the end curled inwards, completely closing up the opening in front, leaving only a small opening on each side. The ends of the curled-in part look like elephant's ears on a small scale. On the spadix above the part which bears the flowers there is a sharp disk, which projects about half an inch. The petiole is bright unspotted green; and altogether the plant is a very handsome one, and, I am sure, would be much admired; the spathe is nearly a foot across the ears, and is beautifully reticulated with light-coloured veins. I have never seen it below 6000 feet; *Ariscema speciosum* comes as low as 4000 feet in moist shady places. If these Arums could be acclimatized in England (which I much doubt), they would be most valuable for planting in pheasant-covers. The Sikkim Horned Pheasant prefers the fruit of them to any other kind of food; and I suppose the common Pheasant would do the same.

Have you never observed that the anthers of *Codonopsis inflata* are always burst, and the stigma covered with pollen before the flowers open? It is, I think, a good example of independent fertilization.

About 80,000 lbs. of India-rubber have been collected in this locality during the past season; but the trees have been terribly hacked about, and, I am afraid, will yield but little next year. There appear to be at least three species of *Ficus* from which rubber is extracted. They grow along the banks of streams, perched on the tops of rough-barked trees, in the hot moist valleys from 3500 feet down to the plains. The large aerial roots, which take the form of stems, are merely notched with knives to allow the milk to escape, which, as soon as congealed, is collected, and is then ready for market.

---

* It is probably *A. Hookerianum*, Schott.

Extract of Letter addressed to Dr. HOOKER by JOHN HORNE, Esq., F.L.S., Subdirector of the Botanic Gardens, Mauritius, dated Mauritius, 12th November, 1874.

[Read February 4, 1875.]

I RETURNED from the Seychelles on 1st October last, after spending three months there. During that time I visited Mahé (the principal island of the group), Praslin, Silhouette, Félicité, La Digue, Aux Frégates, St. Anne, Aux Cerfs, and was prevented from landing at Marie Anne, a small isle about a mile from Félicité, in consequence of a rough sea and because the boat could not be detained. Isle Curieuse I visited on a former occasion. All these islands I travelled over, and searched carefully and minutely, visiting every locality where a new or rare plant could be found, and never allowing my thoughts to deceive me. I can assure you I worked very hard, knocking up the men that were with me as guides several times, but enjoyed my work very much, and considerably improved my health and strength notwithstanding fatigues and frequent wettings. I collected about three hundred species, some of which I may have gathered on the previous tour; but the bulk of them I had not seen before. I have the specimens separated into their natural orders as nearly as I can make them out here; and I hope to be able to send the largest portion of them to you by the next mail, with notes relating to each. I doubt really if many of them will be new; but, as you remarked, many may prove to be geographically interesting.

Without minutely considering this subject, I may remark that the Seychelles' flora has more affinities to the floras of Madagascar, East Africa, South of India, Malay islands, and Polynesia or Oceania than to those of either Mauritius or Bourbon. I have yet to discover a genus or even a species which is only found in the Seychelles and the two last-named places. That representatives of the same genera and species are common in Mauritius, the Seychelles, and Bourbon is not to be gainsaid; but such plants have a much wider range, and are common in several other countries. On the other hand, the greatest portion of the Seychelles' genera and species are plants common to all or, in many instances, to one or another of the four first-named places. For example, I may quote for S. India *Campnosperma zeylanicum*, which is one of the commonest trees in the Seychelles, *Dittelasma rarak* for the Malay islands; those for Madagascar and E. Africa are so numerous that examples are needless. The Oceanic or Polynesian flora has many representatives in Seychelles, among which may be mentioned, *Barringtonia speciosa, B. racemosa, Calophyllum inophyllum, Heritiera littoralis, Cordia subcordata*, &c. Calophyllums of two or three species are indigenous to Mauritius; but *C. inophyllum* is not one of them. Besides the above, it is to be noted that several other oceanic genera and species are not found in Mauritius, although common plants in the Seychelles. The geological formations of the several parts may have something to do in the distribution of plants, as well as the currents of the ocean. The Seychelles, Madagascar, E. Africa, and S. India are granitic, as well as many of the Malay and Polynesian islands; and during all the greater part of the year a strong sea-current passes the Seychelles from the east.

The appearance, nature, and kind of plants I collected in the Seychelles in 1871 lead me to form the above opinion regarding the Seychelles' flora. When you have seen and examined the plants I collected in the Seychelles this year, I have no doubt that this opinion will be confirmed, the whole being taken into consideration. I have also concluded, whether rightly or wrongly, that the balance of the Seychelles' flora is in favour of the Mascarene, if the flora of Madagascar is the typical one, but not if the Mauritius flora is the standard round which the Mascarene flora is gathered. Of course the Seychelles have what may be termed their local peculiarities; but what these are it would be difficult for me to guess, as I have not many books of reference and have but few specimens from Madagascar. Besides, at least to me, comparatively little is known of the plants in that large island. When more is known of them, I dare say that some plants which may now be considered peculiar to the Seychelles will be found to belong to Madagascar also. I here more especially refer to the unnamed Rubiaceæ in my last collection. The publication of two or three works now in hand will throw a good deal of light on this subject. I allude to the 'Flora of Mauritius and the Seychelles' by Mr. Baker, the 'Flora of Tropical Africa' by Professor Oliver, and the 'Flora of India.' But it will not be well lighted up until more of the Madagascar plants are known. To any young man who wished to make a name for himself, exploring and collecting the plants of Madagascar would be really worth his trouble.

I called at the Botanic Gardens, Bourbon, when on my way to the Seychelles; and I am glad to say that they are very much improved since I saw them last. The Government of the island has taken the management of them into its own hands.

List of Plants collected in New Guinea by Dr. A. B. Meyer, sent to Kew December 1874. By Daniel Oliver, Esq., F.R.S. & L.S.

[Read April 15, 1875.]

Dr. Adolf Bernhard Meyer, Director of the Royal Natural-History Museum of Dresden, recently forwarded to Dr. Hooker, for the Kew Herbarium, the few dried plants which he was able to preserve during his visit to New Guinea (with a view to zoological and anthropological research) in 1873.

As he requested that in case any of the species proved to be new they should be published, I have drawn up the annexed list of the whole (there are but ten altogether), with descriptions of the two novelties, for the Linnean Society.

Kew, December 30, 1874.

No. 5. **Canavalia obtusifolia**, *DC.*
Hab. Elefantgeberge, Geelvinksbay.

Nos. 9 & 11. **Pentaphragma macrophylla**, *Oliv.*, sp. nov. Foliis amplis oblique ellipticis breviter acuminatis basi inæquilateris penniveniis, margine dentibus crebriusculis æquilongis sæpe incurvis eleganter serratis, supra glabris, subtus vernatione tomentellis, racemis axillaribus multifloris pedunculis incrassatis, calycis lobis lineari-lanceolatis acutis corollæ crassiusculæ lobis oblongo-ovatis 2plo longioribus.

Folia alterna, 15 poll. longa, 6–7 poll. lata; petiolus $1\frac{1}{2}$–$3\frac{1}{2}$ poll. longus. Pedunculus $\frac{1}{2}$–2 poll. longus; bracteæ lineari-lanceolatæ $\frac{1}{4}$–$\frac{1}{2}$ poll. longæ. Calyx (cum pedicello) 2 poll.; tubus teretiusculus lævis, lobi $\frac{1}{2}$–$\frac{3}{4}$ poll. longi.
Hab. Geelvinksbay.

No. 6. **Scævola Kœnigii**, *Vahl.*
Hab. Elefantgeberge, Geelvinksbay.

No. 8. WEDELIA BIFLORA, *DC.*
Hab. Elefantgeberge, Geelvinksbay.

No. 7. CERBERA ODOLLAM, *Gært.*, var. OBTUSIFOLIA.
Hab. Elefantgeberge, Geelvinksbay.

No. 4. CORDYLINE TERMINALIS, *Kth.*, var. INFUNDIBULARIS, *Baker.* Folia subpedalia 12–15 lin. lata. Racemus simplex laxus, floribus subsessilibus infundibuliformibus 2 lin. longis, segmentis basi brevissime coalitis.

Differs from var. *sepiaria* of the Fiji Islands in its smaller leaves, simple subspicate raceme, and shorter funnel-shaped perianth. (*J. G. B.*)

Hab. Geelvinksbay.

Nos. 1 & 2. DENDROBIUM TRICHOSTOMUM, *Reich. fil. MSS.* (§ Planifolia, *Reich. f. in Walpers's Ann.* vi. 282). Caulibus fasciculatis elongatis gracilibus sæpius foliosis, foliis distichis ovato-lanceolatis vel ellipticis acutis tenuibus, vaginis granulato-scabridis, floribus axillaribus folio brevioribus fasciculatis v. breviter racemosis (ut videtur pallide roseis) bracteatis, bracteis brevibus ovatis acutis, sepalis subæquilongis oblongis obtusis, petalis conformibus, mento obtusissimo, labello calciformi integro obovato-oblongo obtuso longitudinaliter nervoso margine incurvo fimbriato extus infra marginem puberulo, columna brevissima glabra.

Caulis 1–$1\frac{1}{2}$-ped. Folia $1\frac{1}{3}$–2 poll. longa, $\frac{1}{4}$–$\frac{3}{4}$ poll. lata. Bracteæ $\frac{1}{6}$–$\frac{1}{4}$ poll. longæ. Sepala $\frac{1}{6}$ poll. lata. Mentum $\frac{1}{6}$–$\frac{1}{4}$ poll. longum.

Hab. Geelvinksbay.

Nos. 3 & 10. HEDYCHIUM, aff. *H. angustifolio*, Roxb.
Hab. Geelvinksbay.

(Besides the above numbered specimens, the two following Ferns were found entangled in the *Dendrobium.*

Trichomanes filicula, Bory, var.

Polypodium undistinguishable in its barren state from *P.* (*Pleuridium*) *selligueoides*, Baker. (*J. G. B.*)

Notes on Algæ from the Island of Mangaia, South Pacific.

By G. DICKIE, M.D., F.L.S.

[Read April 15, 1875.]

FOR the collection to which this communication refers I am indebted to the kindness of the Rev. W. W. Gill, who for many years acted as missionary in the island. He states that, "owing to the shallowness of the water on the reef, the Algæ are not numerous."

A few notes attached to the specimens are inserted between inverted commas.

FUCACEÆ.

SARGASSUM POLYPHYLLUM, *J. Ag.*
Geog. dist. Sandwich Islands.

S. VULGARE, *Ag.*
Geogr. distr. Warmer parts of Atlantic; Philippines; Australia; New Zealand.

TURBINARIA ORNATA, *Turn.*
Geog. dist. Various parts of Pacific; Coast of Chili.

DICTYOTACEÆ.

ZONARIA OBSCURA, n. sp.

Fronde procumbente, coriacea, suborbiculari, undulata vel parce lobata, pagina inferiore radicante, stuposa.

It belongs to the stemless division of the genus; in perpendicular section there are seven layers of cells. The specimens are about an inch in breadth, of a very dark olive-colour. It grows closely applied to the irregular surface of corals. "Native name *Kana*."

ECTOCARPACEÆ.

SPHACELARIA PULVINATA, *Harv.?*

Mixed with *Microdictyon* and very fragmentary.

Geogr. distr. Port Philip; New Zealand.

RHODOMELACEÆ.

POLYSIPHONIA CALOTHRIX, *Harv.?*

A few imperfect specimens attached to *Turbinaria*.

Geogr. distr. King George's Sound.

LAURENCIACEÆ.

LAURENCIA OBTUSA, *Lam.*

The ordinary form as well as the variety *gracilis*.

Geog. dist. Very widely diffused in both hemispheres.

CORALLINACEÆ.

LITHOTHAMNION DARWINI, *Harv.*
Geog. dist. King George's Sound.

MELOBESIA PUSTULATA, *Lamx.*

Growing upon *Laurencia*.

Geogr. distr. Atlantic; Mediterranean; Australia; Norfolk Island.

JANIA TENELLA, *Ktz.*

Upon *Turbinaria*.

Geog. dist. Mediterranean; shores of Mexico.

GELIDIACEÆ.

GELIDIUM RIGIDUM, *Vahl.*
Geog. dist. Warmer parts of Atlantic; Indian Ocean; Pacific.

HYPNEA RUGULOSA, *Mont.*

"Native name *Enaena*; edible; used with juice of cocoa-nut."

Geogr. distr. Island of Tond, in Torres Straits.

HELMINTHOCLADIEÆ.

LIAGORA VISCIDA, *Forsk.*

"Native name *Karekare*."

Geogr. distr. Mediterranean; Adriatic; W. Indies; Indian Ocean; Red Sea; Australia; Tasmania.

L. AUSTRALASICA, *Sonder ?*

The specimens are rather imperfect.

Geogr. distr. Western Australia.

GALAXAURA ANNULATA, *Lamx.*
Geog. dist. Indian Ocean; Sandwich Islands.

G. LAPIDESCENS, *Sol.*
Geog. distr. Australia; Red Sea; Madagascar; Canary Islands.

SIPHONACEÆ.

CAULERPA CYLINDRACEA, *Sonder.*

"Native name *Rimu*. Edible."

Geogr. distr. Australia.

C. URVILLEANA, *Mont.*
Geogr. distr. Island of Tond, in Torres Straits.

C. MACRODISCA, *Dne.*
Geog. distr. Anambas Islands (Australian archipelago).

HALIMEDA MACROLOBA, *Dne.*

Geog. distr. W. and S. Australia ; Madagascar ; Red Sea ; Indian Ocean ; Keeling Islands ; Friendly Islands.

H. OPUNTIA, *Lamx.*

Geog. dist. Warmer parts of Atlantic ; Mediterranean ; Red Sea ; &c.

CODIUM TOMENTOSUM, *Ag.*

Geog. distr. Tropical and Temperate.

Occurs in both hemispheres : Antarctic islands.

ULVACEÆ.

ULVA LATISSIMA, *L.*

Mr. Gill, in a note, states, "introduced in 1852, when a whaling ship from the Antarctic was wrecked on the reef."

Geog. distr. Widely distributed in both hemispheres.

VALONIACEÆ.

MICRODICTYON MONTAGNEI, *Harv.*

Geog. distr. Friendly Islands.

CONFERVACEÆ.

CLADOPHORA PELLUCIDA, *Ktz.*

Geogr. distr. Western Australia ; Cape G. Hope ; shores of Europe.

OSCILLARIACEÆ.

LYNGBYA TROPICA, *Ktz.*

Geogr. distr. Gulf of Guinea.

Of the species recorded here, the majority are forms chiefly found in various parts of the S. Pacific, and a few, such as *Codium*, &c., of general occurrence in both hemispheres.

On the Characteristic Colouring-matters of the Red Groups of Algæ. By H. C. Sorby, F.R.S., F.L.S., Pres. R.M.S., &c.

[Read May 6, 1875.]

In my paper "On Comparative Vegetal Chromatology"* I showed that the three great divisions of Algæ—the olive, the red, and the green—are, on the whole, very definitely distinguished from one another by the presence or absence of the various green or yellow substances insoluble in water belonging to the chlorophyl and xanthophyl groups. I now propose to consider more especially the general distribution of some of the principal coloured constituents which are soluble in water. It would be difficult to find another series of colouring-matters of greater beauty, or with such remarkable and instructive chemical and physical peculiarities.

Although all easily soluble in water, there seems very good evidence to prove that in the living plants they are either in a solid state or combined with a very small quantity of water, and not disseminated through the whole liquid contents of the cells, like the entirely different class of red colouring-matters found in the leaves of the higher classes of plants. On keeping the Algæ in a small quantity of water, they soon die and begin to decompose; and then the various colouring-matters are set free and dissolved, the change being indicated by the absorption-band in the spectrum being a little nearer the blue end than in the spectrum of the living plant, and by the fluorescence being greatly increased. In some Algæ this change takes place very rapidly, and in some so slowly that the colouring-matters are lost by decomposition before a satisfactory solution can be procured; but by using no more water than is necessary to cover the plant operated on in a small corked bottle, a solution may generally be obtained which is of beautiful pink or purple colour, according to the nature of the plant. Such a solution, after having been filtered, must be carefully studied by the same spectrum method as I have described in many previous papers, and by the employment of special means which I now propose to explain.

The total number of different coloured substances characteristic of the various divisions of the red groups of Algæ is at least six. These are distributed in very variable proportions in different genera and species; and much remains to be learned respecting the cause of this variation. There appears to be no doubt that the age of the plant and the circumstances in which it grows have influence on their amount and relative proportion; but at the same time there is manifestly a most intimate connexion between them and the general organization; so that there is a relation between the particular colouring-matters and the position of the plants in the natural system of classification. Premising, then, that very much remains to be learned, I will now proceed to give an outline of some of the principal facts which I have so far been able to observe in a more or less satisfactory manner.

---

* Proc. Roy. Soc. vol. xxi. p. 442.

In the first place, I must say that in this paper I shall describe the position of the absorption-bands seen in the spectra by giving the wave-lengths of the light corresponding to their centres in millionths of a millimetre, as explained in my late paper to the Royal Microscopical Society*, since I am more and more convinced that it is the true method. I shall also express the width of the bands when seen to the greatest advantage by giving the difference between the wave-lengths of their two extreme edges; but since my chief object is to point out the bearing of my subject on botany, I shall enter as little as possible into mere physics and chemistry. I must, however, to some extent; or else the evidence on which my conclusions are founded could not be understood.

As far as my present knowledge extends, red Algæ contain at least six different characteristic colouring-matters soluble in water. Various mixtures of these have been called *Phycocyan* and *Phycoerythrin*; and I do not think that one can do better than adopt these terms *generically*, and express the difference between the individual species by the addition of words indicating their colour. Thus, for example, the dark species of *Oscillatoria*, so common in clear still water (*O. nigra*), yields a splendid purple solution, which has been called phycocyan; but, as I have long ago shown in various papers†, this is chiefly a mixture of two distinct substances—one a purple, having a well-marked absorption-band whose centre is at wave-length 621 millionths of a millimetre, and the other a pink, having an absorption-band at 567 millionths of a millimetre. They may therefore be called respectively *purple phycocyan* and *pink phycocyan*. Solutions of such substances in water often change rapidly, owing to the development of various minute organisms; but if clean white lump sugar be added to the solution until no more is dissolved at the ordinary temperature, decomposition occurs very slowly, and does not appear to occur at all in hermetically sealed tubes. Having, then, prepared a solution, its compound nature may be proved by various methods; but that to which I am the most anxious to direct attention depends on the fact that some of the colouring-matters are decomposed when heated to the temperature at which albumen coagulates, whereas others resist one considerably higher. Thus, in the case of the coloured solution in syrup obtained from *Oscillatoria* by carefully keeping it in a water-bath at a temperature of 75° C., the pink phycocyan is soon changed into an insoluble pink substance; and as soon as the change is complete and the absorption-band at the yellow end of the green has disappeared, on filtering the liquid a clear solution of purple phycocyan is obtained. By comparing, side by side, the spectra of the original and of the cold but previously heated solution, we can see very clearly that the bands of the purple phycocyan remains nearly as at first, whilst little or no trace of the other can be detected. These facts will be better understood by means of the following figure.

---

* Monthly Mic. Journ. 1875, vol. xiii. p. 198

† Ib. 1870, vol. iii. p. 229, &c.

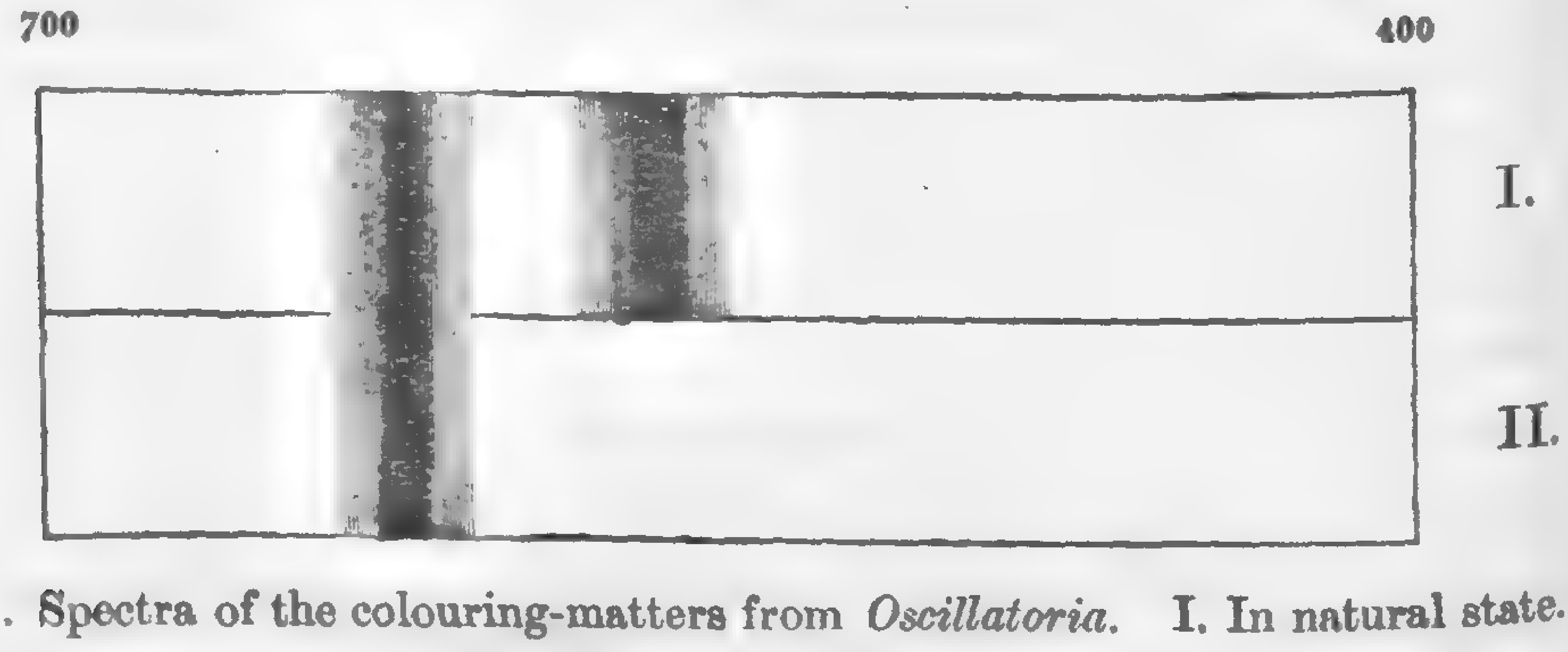


Fig. 1. Spectra of the colouring-matters from *Oscillatoria*. I. In natural state. II. Heated to 75° C.

This and fig. 2 are both drawn in proportion to wave-lengths; and therefore the red end appears broader, and the blue narrower than when seen in an ordinary spectroscope.

In a similar manner we can prove that the beautiful purple solution obtained from *Porphyra vulgaris* is due to a mixture of four different substances. In a natural condition it gives a spectrum with four well-marked bands and one much fainter; and on heating the aqueous solution to 65° C., the two at the red end disappear and the other three remain. If the natural solution saturated with sugar be heated for a short time to not above 80° C., only one of the bands at the red end disappears, and the other remains until the heat is raised to above 80° C.; and then, when cold, only the bands in the green remain. It will of course be apparent that these changes do not depend on the temperature of the solution, since it is examined after cooling, but on decompositions produced by the heat. These facts will be better understood by means of the following figure, which is to some extent diagrammatic, the relative intensity of the bands being not exactly as seen in any one thickness of the solutions.

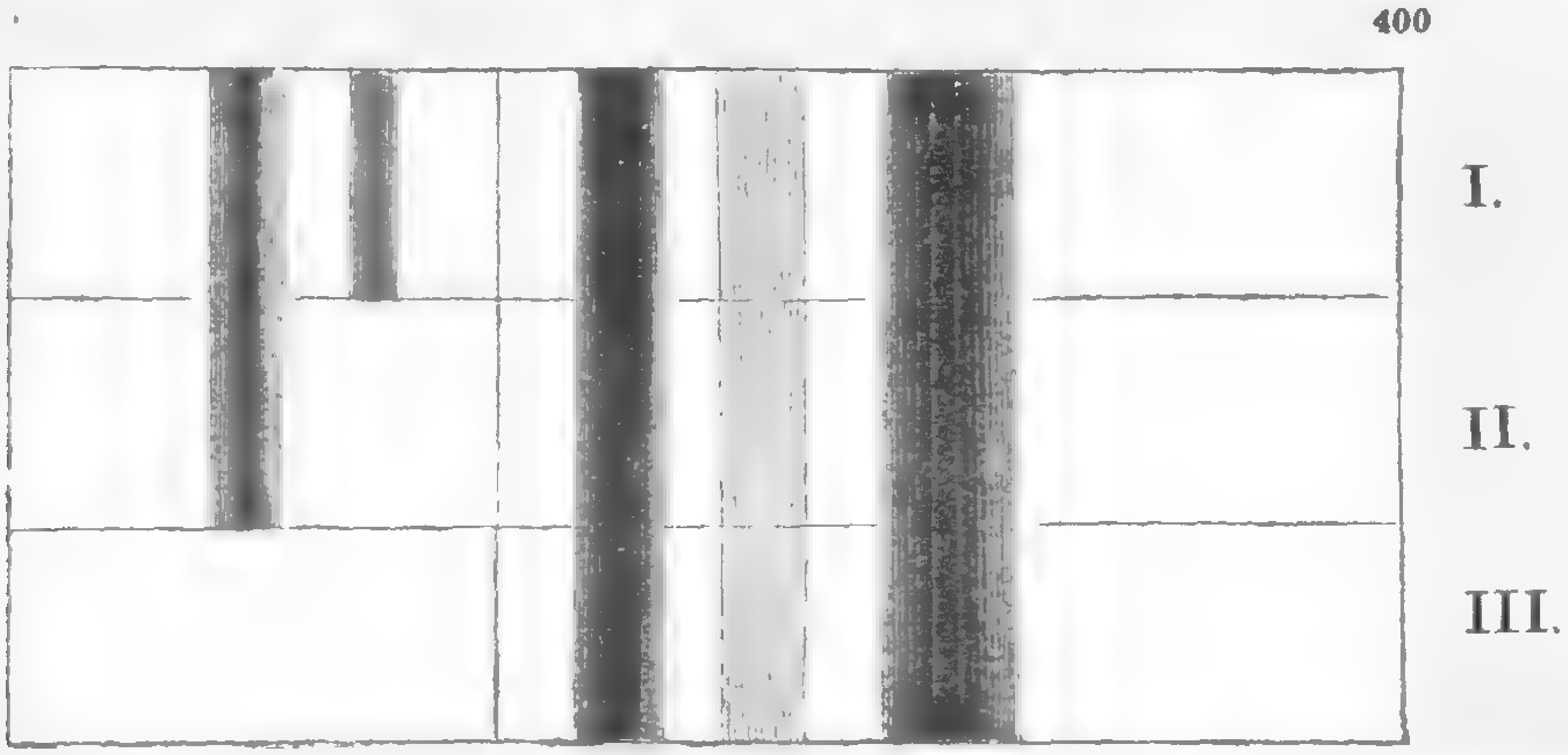


Fig. 2. Spectra of the colouring-matters from *Porphyra vulgaris*. I. In natural state. II. Solution in syrup heated to 80° C. III. Solution in syrup heated to above 80° C.

Since on the present occasion it does not appear desirable to enter into physics and chemistry, I will merely say that by these and other means I have found that various red Algæ contain at least six different colouring-matters, which, however, have certain characters in common. They all give spectra with one well-marked absorption-band, and more or less distinct traces of a second, lying nearer to the blue end. Five of them have a very strong and splendid fluorescence; and all are decomposed when heated to a temperature below that of boiling water, which is not the case with the red colouring-matters found so abundantly in the leaves of the higher classes of plants, with which, in fact, they have scarcely any thing in common. They are also decomposed by alcohol, which is not the case with the different kinds of erythrophyl.

I do not think that I could do better than indicate the more important differences between the various kinds of phycocyan and phycoerythrin than by means of the following Table, in which the position of the centres of the principal bands of each substance is shown by the wave-length of the light at that part of the spectrum in millionths of a millimetre, and their width by the difference between the wave-lengths of the opposite sides when the the bands are well defined. The lowest temperature at which each of the substances is slowly decomposed when dissolved in syrup is given in degrees Centigrade.

Name of substance.	Centre.	Width.	Fluorescence.	Decomposed at
Blue phycocyan, *Oscill.*......	650	18	Strong red.	75° C.
Purple phycocyan, *Os.*	621	32	Strong rose.	80
" " *Porph.*...	621	32	"	68
Pink phycocyan, *Os.*.........	567	29	Doubtful.	65
Pink phycoerythrin, *Por.*...	569	18	Strong orange	80
Red phycoerythrin, *Por.* ...	497	27	None.	80

These different substances are also decomposed in a varying manner by alcohol of various strength; and the results of the study by that means agree with those arrived at by heating the solutions as described.

The chemical and physical relations of these colouring-matters of Algæ are so remarkable that I feel much tempted to enter into them more fully, but forbear, since I am more particularly anxious to consider their distribution in the different groups of the plants. The two principal colouring-matters of *Oscillatoria* soluble in water are entirely different from the two most characteristic of the Florideæ as found in such examples as *Schizymenia edulis.* With the exception of the blue chlorophyl common to all, the other colouring-matters belonging to the xanthophyl group are equally distinct; so that the *Oscillatoriæ* and the Florideæ are as well distinguished by their chromatological characters as by their general structure. Perhaps in some cases they have traces of some substances in common; and there are well-marked connecting-links. For instance, *Cystoclonium purpurascens* and *Polysiphonia elongata* contain a small quantity of either purple phycocyan or some substance closely allied to it, which is the cause of their more purple tint; and *Porphyra vulgaris,* besides this, contains some blue phycocyan closely, if not absolutely, agreeing with that occurring in *Oscillatoria*; but in all these cases the pink and red phycoerythrins are the chief coloured constituents, whereas they are almost or quite absent from *Oscillatoria.*

The Batrachospermæ differ little, if at all, from such marine Algæ as I have just named.

An Alga which grows abundantly in some of the small streams in the neighbourhood of Sheffield, which Mr. Archer says is *Lemanea fluviatilis*, is a far better example of a connexion between the two great divisions, but yet differs strikingly from both. It contains a very considerable amount of a substance giving the same general spectrum as the purple phycocyan of *Oscillatoria*, which, however, is decomposed at a very considerably lower temperature. *Lemanea* also differs in containing a relatively far less amount of red phycoerythrin than the more typical red marine Algæ, and, in addition to the pink phycoerythrin, appears to contain a considerable quantity of the same pink phycocyan as that found in *Oscillatoria.* It is thus, on the whole, an excellent case of a connecting-link; and probably further research will enable us to detect other species more completely filling up the gaps. *Palmella cruenta* agrees with the Florideæ in containing much pink phycoerythrin. So much yet remains to be learned, that it would be altogether premature to speculate on the bearings of such facts. In former papers* I have shown that many important changes in the colouring-matters are brought about by a variation in the amount of light in which the plant grows; and such changes must be more fully studied before we can form any very definite conclusions. There is also another most important branch of inquiry which requires much further study. In my paper published in the 'Monthly Microscopical Journal' † I have shown that there is in some cases an intimate connexion between the spectra of closely related substances, and that, when spectra differ only in wave-length, there is probably some relation between the two substances. The further examination of this question may throw much light on the mutual relations between the various colouring-matters found in Algæ. Thus, for example, it appears extremely probable that the pink phycocyan of *Oscillatoria* may be chemically changed into the pink phycoerythrin of the Florideæ; and perhaps the further study of the conditions under which this takes place may throw much light on the development of the particular substances in the living plants. Though so much remains to be learned, yet even now the facts appear sufficient to prove that there is some most intimate connexion between the general organization of plants and their coloured constituents; and I very strongly commend to botanists the further study of the very important and interesting group of substances to which I have directed attention in my present communication, which must be looked upon merely as a general introduction to a wide and difficult subject.

---

* Proc. Roy. Soc. vol. xxi. p. 442; Quart. Journ. of Science, vol. iii. (N. S.) p. 451.

† Vol. xiii. p. 198.

Contributions to the Botany of H.M.S. 'Challenger.'

XXI. Algæ* collected by H. N. Moseley, Esq., M.A., at Simon's Bay, C. G. H., Seal Island, Marion Island, Kerguelen's Island, and Heard Island in 15 to 20 fathoms. By George Dickie, M.D., F.L.S.

[Read February 4, 1875.]

RHODOMELACEÆ.

POLYSIPHONIA INCOMPTA, *Harv.*?

The specimens are imperfect, and I therefore have some doubt as to the species.

Geogr. distr. Cape G. Hope.

SPHÆROCOCCOIDEÆ.

NITOPHYLLUM UNDULATUM, *Ktz.*

The specimens are young or dwarf.

Geogr. distr. Cape G. Hope.

CRYPTONEMIACEÆ.

GIGARTINA BURMANI, *Ag.*

Geogr. distr. Cape G. Hope; and, according to Suhr, found also at Cape Horn.

* In the "Contributions," No. XVII., relating to Tristan d'Acunha, the following should be added by way of supplement:—

PRASIOLA CALOPHYLLA, *Meneg.*

A green crust on moist rocks. I have compared it with Scotch and Irish specimens and can see no essential difference. The plant is also found in France and Germany.

CERAMIACEÆ.

CALLITHAMNION GRACILE, *H. f. & Harv.*?

The plant is very probably a form of this species, differing only in the proportions of the upper articulations, which are about twice as long as broad.

Geog. dist. Campbell Island.

SIPHONACEÆ.

CAULERPA FILIFORMIS, *Hering.*
Geogr. distr. Coasts of S. Africa.

XXII. Algæ collected by Mr. MOSELEY at Seal Island.

By GEORGE DICKIE, M.D., F.L.S.

[Read February 4, 1875.]

"THIS is a low rounded granite rock in False Bay, about eight miles from Simon's Bay, Cape of Good Hope. A perpetual surf washing on the island renders landing difficult. It is inhabited by sea-birds, especially *Spheniscus demersus* (Jackass Penguin), and *Phalacrocorax capensis* (Cape Cormorant)."

The algæ form a thick covering to the rock in the surf.

FUCACEÆ.

SPLACHNIDIUM RUGOSUM, *Grev.*
Geogr. distr. S. Australia; Tasmania; New Zealand; Indian Ocean; Cape G. Hope.

LAURENCIACEÆ.

LAURENCIA VIRGATA, *Ag.*
Geog. distr. Cape G. Hope.

GELIDIACEÆ.

CHÆTANGIUM ORNATUM, *L.*
Geogr. distr. Cape G. Hope.

CRYPTONEMIACEÆ.

IRIDÆA CAPENSIS, *J. Ag.*
Geogr. distr. Cape G. Hope.

CERAMIACEÆ.

CERAMIUM CAPENSE, *Ktz.*
Geogr. distr. Cape G. Hope.

CENTROCERAS CLAVULATUM, *Ag.*
Geogr. distr. In the warmer seas of both hemispheres.

SIPHONACEÆ.

BRYOPSIS CÆSPITOSA, *Suhr.*
Geogr. distr. Coast of S. Africa.

ULVACEÆ.

PORPHYRA LACINIATA, *Ag.*
Geog. dist. Widely spread in both hemispheres.

XXIII. Algæ collected by Mr. MOSELEY at Marion Island, in 40 fathoms. By GEORGE DICKIE, M.D., F.L.S.

[Read February 4, 1875.]

THIS is the most southern of the group called Prince Edward's Islands, and about 1100 miles south of Cape G. Hope, lat. 45° S., long. 40° W.

SPOROCHNACEÆ.

DESMARESTIA VIRIDIS, *Lam.*
Geog. dist. Widely distributed in the temperate and colder seas of both hemispheres.

LAMINARIACEÆ.

MACROCYSTIS PYRIFERA, *Ag.*
Geogr. distr. Cape G. Hope; Indian Ocean; California.

RHODOMELACEÆ.

DASYA BERKLEYI, *Mont.*
Geog. distr. Auklands; Falklands; Cape Horn; Coast of Chiloe; Kerguelen.

LAURENCIACEÆ.

CLADHYMENIA PELLUCIDA, n. sp.?
Fronde lineari, tenui, membranacea, pluries pinnata, costa pellucida api-

cem versus obsoleta percursa; pinnis pinnulisque alternis, pinnulis serrato-dentatis.

The specimens are destitute of fructification; but on some there are wart-like bodies like those of *C. conferta*, figured in 'Nereis Australis.'

SPHÆROCOCCOIDEÆ.

DELESSERIA LYALLII, *H. f. & Harv.*
Geog. distr. Falklands and Kerguelen.

CRYPTONEMIACEÆ.

CALLOPHYLLIS DICHOTOMA, *H. f. & Harv.*
Geog. distr. Campbell Island.

EPYMENIA OBTUSA, *Grev.*
Geogr. distr. Cape G. Hope; Cape Horn; Auckland Islands.

CERAMIACEÆ.

BALLIA CALLITRICHA, *Ag.*

A single but very luxuriant specimen, 12 inches long.

Geog. distr. Falklands; Aucklands; New Zealand; Australia; Tasmania; Kerguelen.

A bleached fragment of the same plant from fresh-water pools, accidentally conveyed by birds (?), had on it a minute *Conferva* and *Sphærozyga*, both too imperfect for recognition.

CONFERVACEÆ.

CHROOLEPUS AUREUM, *L.*

Geog. distr. Cape Horn; Falkland Islands; Kerguelen; widely diffused in Europe.

XXIV. Marine Algæ collected by Mr. MOSELEY at the Island of Kerguelen. By GEORGE DICKIE, M.D., F.L.S.

[Read February 4, 1875.]

FUCACEÆ.

D'URVILLÆA UTILIS, *Bory.*
Geog. distr. "Tierra del Fuego, the Falkland Islands, and Kerguelen's Land; very abundant at half-tide mark and below it; also in the

open ocean between lat. 45° and 55° S., reaching the 65th degree of S. lat. in the meridian of New Zealand."—*Antarctic Flora.*

D'U. Harveyi, *H. f.*

Some of Mr. Moseley's specimens are destitute of the peculiar honey comb-like structure of the former, and are recorded here as young or small examples of this species.

Geog. distr. Cape Horn and Falklands.

SPOROCHNACEÆ.

Desmarestia Rossii, *H. f. & Harv.*
Geog. distr. Cape Horn and Falklands.

D. chordalis, *H. f. & Harv.*
Geog. distr. Kerguelen only.

D. media, *Grev.*

This is considered by some authorities a form of *D. aculeata,* well known in northern temperate and arctic seas.

D. viridis, *Lam.*
Geog. dist. Shores of W. Europe; Unalaschka; Cape Horn; Falklands.

LAMINARIACEÆ.

Macrocystis pyrifera, *Ag.*
Geog. distr. Antarctic seas from 40° to 64° lat.; Chili; New Zealand; Indian Ocean; California.

Lessonia fuscescens, *Bory.*
Geog. distr. Chili; Cape Horn; Falklands.

CHORDARIACEÆ.

Adenocystis Lessonii, *H. f. & Harv.*
Geog. dist. Cape Horn; Falklands; Auckland and Campbell Islands; Cockburn Island.

ECTOCARPACEÆ.

Ectocarpus geminatus, *H. f. & Harv.*

Mr. Moseley found it plentiful on *Desmarestia.*

Geog. distr. Cape Horn; Falklands.

RHODOMELACEÆ.

Polysiphonia anisogona, *H. f. & Harv.*
Geog. distr. Cape Horn; Falklands.

DASYA BERKLEYI, *Mont.*
Geog. dist. Cape Horn; Falklands.

LAURENCIACEÆ.

DELISEA PULCHRA, *Mont.*
Geogr. distr. W. and E. Australia; S. Tasmania.

PTILONIA MAGELLANICA, *J. Ag.*
Geog. distr. Cape Horn; Falklands.

CORALLINACEÆ.

MELOBESIA VERRUCATA, *Lamx.*

Growing upon specimens of *Ballia.*

Geog. distr. Atlantic; Mediterranean; Aucklands; New Zealand; Tasmania.

SPHÆROCOCCOIDEÆ.

DELESSERIA DAVISII, *H. f. & Harv.*
Geog. distr. Cape Horn; Falklands.

D. LYALLII, *H. f. & Harv.*
Geog. dist. Falkland Islands.

NITOPHYLLUM FUSCO-RUBRUM, *H. f. & Harv.*
Geogr. distr. Kerguelen only.

N. MULTINERVE, *H. f. & Harv.*?

A solitary specimen is referred with doubt to this species; in the 'Antarctic Flora' there is also an expression of doubt respecting it.

Geog. dist. Cape Horn; Falklands.

GELIDIACEÆ.

CHÆTANGIUM VARIOLOSUM, *Mont.*
Geog. distr. Cape Horn; Falklands.

RHODYMENIACEÆ.

RHODYMENIA VARIOLOSA, *H. f. & Harv.*

A solitary example with narrow segments.

Geog. distr. Kerguelen only.

PLOCAMIUM HOOKERI, *Harv.*
Geog. distr. Kerguelen only.

CRYPTONEMIACEÆ.

AHNFELTIA PLICATA, *Huds.*

Geog. distr. Temperate and colder seas in the northern hemisphere; Falkland Islands.

CALLOPHYLLIS VARIEGATA, *Bory.*

Geog. distr. Peru; Chili; New Guinea; Cape Horn; Falklands; Auckland Islands.

KALLYMENIA DENTATA, *Suhr.*

Varieties α and γ.

Geog. dist. Cape G. Hope.

GIGARTINA RADULA, *Esp.*

Geog. distr. Cape G. Hope; New Zealand; Auckland and Campbell Islands; California.

IRIDÆA CAPENSIS, *J. Ag.*

Geog. distr. Cape G. Hope.

I. LAMINARIOIDES, *Bory.*

Mr. Moseley's collection contains several specimens which I think belong to this species.

Geog. distr. South-western shores of Chili; Auckland Islands.

CERAMIACEÆ.

CERAMIUM RUBRUM, *Ag.*

Geog. distr. General in colder seas of both hemispheres.

BALLIA CALLITRICHA, *Ag.*

Geog. distr. Falklands; ; New Zealand; Aucklands; Australia; Tasmania.

SIPHONACEÆ.

CODIUM TOMENTOSUM, *Stackh.*

Geog. distr. Temperate and colder seas of both hemispheres.

ULVACEÆ.

PORPHYRA VULGARIS, *Ag.*

P. LACINIATA, *Ag.*

Geog. distr. Both widely distributed in northern and southern hemispheres.

ENTEROMORPHA COMPRESSA, *Grev.*

Geog. distr. Temperate and colder seas in both hemispheres.

ULVA LATISSIMA, *L.*
Geog. distr. Very general in both hemispheres.

CONFERVACEÆ.

CLADOPHORA RUPESTRIS, *L.*
Geog. distr. General between arctic circle and Mediterranean; Kerguelen only in S. hemisphere.

C. ARCTA, *Dillw.*
Geog. distr. German and Atlantic Oceans; Cape Horn and Falklands.

OSCILLARIACEÆ.

CALOTHRIX OLIVACEA, *H. f. & Harv.*
Growing upon *Nitella flexilis.*

XXV. Algæ collected by Mr. MOSELEY at Heard Island, 250 miles S. of Kerguelen. By GEORGE DICKIE, M.D., F.L.S.

[Read February 4, 1875.]

FUCACEÆ.

SCYTOTHALIA OBSCURA, n. sp.?
Frondibus e radice callosa, inferne simplicibus, superne decomposito-pinnatis; phyllodiis linearibus, apicibus indivisis vel bifidis, acutis; receptaculis?

A solitary specimen, having several fronds from a scutate root, agreeing in structure and general habit with the genus *Scytothalia.* What seem to be immature receptacles are crowded on the margins and surface of the fronds.

SPOROCHNACEÆ.

DESMARESTIA ROSSII, *H. f. & Harv.*
Geog. distr. Cape Horn and Falklands.

LAMINARIACEÆ.

LESSONIA NIGRESCENS, *Bory.*
Geog. dist. Chili to Cape Horn.

L. OVATA, *H. f. & Harv.*
Geog. distr. Cape Horn and Falkland Islands.

LAURENCIACEÆ.

DELISEA PULCHRA, *Mont.*
Geog. distr. W. and E. Australia; Tasmania, S. shore; Kerguelen.

SPHÆROCOCCOIDEÆ.

BOTRYOGLOSSUM PLATYCARPUM, *Turn.*
Geogr. distr. Falklands; Chili; California; Cape G. Hope.

RHODYMENIACEÆ.

PLOCAMIUM HOOKERI, *Harv.*
Geogr. distr. Kerguelen.

CRYPTONEMIACEÆ.

CALLOPHYLLIS ELONGATA, n. sp.?
Fronde elongata, parce dichotoma, segmentis linearibus, inferne angusta, prope basin angustissima, margine undulata.

Two specimens of a red-purple colour, without fructification, but having the characteristic structure of the genus.

XXVI. Enumeration of Fungi collected during the Expedition of H.M.S. 'Challenger.' By the Rev. M. J. BERKELEY, M.A., F.L.S. (Second Notice.)

[Read February 4, 1875.]

BERMUDA. June 1873.

40. AGARICUS (MYCENA) ALPHITOPHORUS, *B.* Minutus, totus aleuriatus niveus; pileo conico-campanulato; stipite filiformi; lamellis angustis adscendentibus.

On small twigs, Devonshire Marsh.

Scarcely a line high; stem ½–1 inch high, covered, as well as the pileus, with white mealy particles.

Very delicate.

41. A. (NOLANEA) HELICTUS, *B.* Pileo profunde umbilicato sericeo; stipite torto; lamellis primum dente decurrentibus, demum adnexis; mycelio candido.

On rotten leaf-mould.

Pileus about 1 inch across; stem 1½ inch high, slender. Very much wrinkled, when dry of a pale umber, sometimes browner towards the margin; spores irregular, ·0003 inch long.

In very young specimens the stem is darker, but without any information as to its colour when recent, its exact affinities cannot be ascertained.

42. Marasmius bermudensis, *B.* Pileo convexo pulverulento albido subsulcato, margine inflexo; stipite brevi sursum pellucido, deorsum pulverulento; lamellis distantibus breviter adnatis; interstitiis lævibus.

On dead coffee-wood, Paynter's Vale.

Pileus about 1 line across; stem $\frac{1}{4}$–$\frac{1}{2}$ inch high; gills, when dry, pale tawny with a white edge.

43. M. sabali, *B.* Pileo reniformi tomentoso, demum resupinato; stipite brevissimo; lamellis distantibus adnatis postice rotundatis crassiusculis integerrimis; interstitiis venosis.

On leaf-stalks of *Sabal Palmetto.*

Pileus probably white when fresh; but the whole plant, when dry, is of a pinkish buff, soon resupinate, then at length sulcate; spores subglobose, ·00028 long, hollowed out on one side.

44. Polyporus (Mesopus) arcularius, *Fr.*

Marsh near Mount Langton, on dead sticks.

A slender form with a hispid stem.

45. Hirneola coffeicolor, *B.* Coffeicolor foliacea parva, subtus glabra.

On coffee-bark, Paynter's Vale. June.

The specimens are few in number and possibly young. There seem, however, to be a fertile and a barren side; and if so, they must be referred to *Hirneola*, though the underside is smooth.

46. Sporidesmium antiquum, *Cd.*, var. sparsum.

On dead stems.

If not the plant of Corda, it is so near that I cannot distinguish it.

47. Geoglossum hirsutum, *P.*

On dead *Sphagnum* under ferns in Devonshire Marsh.

The head, as well as the stem, is hispid.

The specimens are young.

48. Ustilago carbo, *Tul.*

49. Hypoxylon concentricum, *Grev.*

On dead wood. Devonshire Marsh.

Bahia. September 1873.

50. Agaricus (Flammula) sapineus, *Fr.*

On dead wood.

51. **Lentinus pygmæus**, *B.* Pileo convexo glaberrimo, margine involuto; stipite subæquali furfuraceo-squamuloso; lamellis integerrimis liberis vel leviter adnexis, annulo primum arachnoideo lamellas tegente.

On dead wood.

Pileus ⅓ inch across; stem ¾ inch high, ½ a line thick.

A curious little species.

52. **L. subtilis**, *B.* Albus; pileo umbilicato squamulis minutis setiformibus aspero, margine ciliato; stipite albo-velutino basi leviter incrassato; lamellis crassiusculis subdistantibus integris decurrentibus.

On dead wood.

Pileus about ¾ inch across; stem ½ inch high, 1 line thick at the base, ¾ in the middle.

Allied to *A. Ravenelii*, B.

53. **L. villosus**, *Fr.*

On dead wood.

54. **Marasmius semisparsus**, *B.* Umbrinus; pileo depresso griseo-pulverulento, margine nudo sulcato; stipite subtiliter tomentoso, basi leviter spongioso; lamellis distantibus aduato-decurrentibus.

On petiole of dead leaf.

Pileus about 2 lines across; stem ½ inch high, twisted and compressed when dry.

A single specimen only, but different from any of the numerous specimens in my herbarium.

55. **Schizophyllum commune**, *Fr.*

On dead wood.

56. **Favolus brasiliensis**, *Fr. Ep.* p. 498.

On dead wood.

57. **Polyporus (Pleuropus) sanguineus**, *Fr.*

On dead wood.

58. **P. (Anodermei) hypocitrinus**, *B.* Tenuis carnosus centro affixus tomentosus, margine inflexo; hymenio citrino; poris labyrinthiformibus; dissepimentis tenuibus.

On dead wood.

About ½ an inch in diameter.

There is a single specimen only.

59. **P. (Placodermei) Auberianus**, *Mont. Cuba*, p. 399.

On dead wood.

60. **P. (Placodermei) australis**, *Fr.*

On dead wood.

61. P. (PLACODERMEI) PERSOONII, *Fr.*
On dead wood.

62. P. (INODERMEI) PINSITUS, *Fr.*
On dead wood.

63. STEREUM VERSICOLOR, *Fr.*
On dead wood.

64. S. PAPYRINUM, *Mont.*
On dead wood.

65. S. KUNZEI, *B.*—Thelephora Kunzei, *Weig. Exs.*; *Hook. Bot. Misc.* ii. p. 162, tab. 85.
On decayed sticks.

66. CYPHELLA PERPUSILLA, *B.* Congesta pallidissime mellea cylindrico-subglobosa, ore minuto aperta.
On the hymenium of *Stereum Kunzei.*
Forming little thin patches. Spores extremely minute.

I see no trace of asci. This species is just intermediate between *Cyphella* and *Solenia.*

67. CORA PAVONIA, *Fr.*
On exposed situations.

68. HIRNEOLA RUFA, *Fr.*—Exidia rufa, *B. Ann. Nat. Hist.* x. p. 384, tab. 12. fig. 17.
On dead wood.

69. LYCOGALA EPIDENDRON, P.
On various decaying substances.

70. XYLARIA INVOLUTA, *Kl.*
On dead wood.

71. X. SCHWEINITZII, *B. & C. Journ. Ac. Nat. Sc. Phil.* ii. 1853, p. 284.
On dead wood.

72. HYPOXYLON TURBINATUM, *B.* Laccatum erumpens, demum omnino liberatum; receptaculo exacte turbinato deorsum attenuato, apice convexo, centro supra perithecia oblonga membranacea leviter depresso.
On dead wood.
About ½ an inch across and nearly as much high; exactly top-shaped; clothed with a thick hard laccate coat, at first coffee-coloured, then pitch-black. Asci subelliptic with a slender pedicel; paraphyses rather thick; sporidia oblong, hyaline, ·00054 inch long.

This curious species is so like Léveillé's genus *Phylacia* that I am inclined to think that either *Phylacia*, when perfect, has asci which in some cases are easily absorbed, or it is merely a stylosporous state of *Hypoxylon*.

73. H. CONOPUS, *Fr. Mont. Cuba*, p. 341.
On dead wood.

74. **H. (GLEBOSI) MOSELEI**, *B.* Orbiculare erumpens leviter depressum marginatum, primum cortice velatum, basi margine tenui circumdatum; peritheciis oblongis; ostiolis papillæformibus deciduis; strato exteriore rigido.
On dead sticks.
About ¼ inch in diameter.

Nearly allied to *Sphæria subaffixa*, Schwein., but of a much harder substance. Unfortunately I find perfect fruit in neither.

TRISTAN D'ACUNHA.

75. **AGARICUS (PHOLIOTA) PHYLICIGENA**, *B.* Pileo convexo carnoso areolato fulvo, primum lævissimo; stipite crasso sursum attenuato, deorsum incrassato infra annulum crassum mobilem transversim flocculoso; lamellis leviter decurrentibus argillaceis.
On trunks of *Phylica arborea*, Oct. 17, 1873.
Pileus 3 inches or more across, convex, at first very smooth and even, at length repeatedly areolate with a depressed wart in each division, margin turned up; stem excentric, attenuated upwards, thick and swollen below, solid, about 2 inches high, 1¼ inch or more thick in the centre; ring thick, very soon detached, and movable; gills moderately broad, crowded, clay-coloured, decurrent, edge pale; spores oblong oblique, about ·0003 inch long, but variable in size.

Very nearly allied to *A. capistratus*, Cooke, but differs in several points, especially in the incrassated stem. There is a misprint in Cooke's description of that species, the figure being quite correct.

76. HYPOXYLON PLACENTÆFORME, *B. & Curt. Journ. Linn. Soc.* x. p. 383.
On dead *Phylica arborea*, Oct. 17, 1873.

MARION ISLE.

77. AGARICUS (NAUCORIA) GLEBARUM, *B. Fl. Ant.* tab. 162. fig. 3.
On *Azorella*, Dec. 26, 1873.
Spores ·0003 inch long.

There are also white, flexuous, filiform threads which look like an *Isaria*; but the component cells are large, and the production is not, I think, fungoid.

78. A. (Psilocybe) atro-rufus, *Schæff.* t. 234.
Spores lemon-shaped, ·00028 inch long.

Kerguelen's Land.

79. A. (Naucoria) glebarum, *B. l. c.*
On *Azorella*, Jan. 1874.

80. A. (Galera) hypnorum, *Batsch.*
On *Azorella*, Jan. 1874.
Spores ·0004 inch long.

81. Coprinus tomentosus, *Fr. Bull.* t. 138.
On dung, Jan. 1874.

82. Peziza kerguelensis, *B. Fl. Ant.* tab. 164. fig. 3.
On the ground, Betsy Cove, Royal Sound, Jan. 1874.

XXVII. Further notes on the Plants of Kerguelen, with some remarks on the Insects. By H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger.' (In a Letter addressed to Dr. Hooker, Pres. R.S.)

[Read February 4, 1875.]

I am very glad that the collection of Marion-Island and Kerguelen plants was satisfactory. I found *Nitella* and the *Limosella* only in the lake at Christmas Harbour. The *Limosella* I may have overlooked in other places, since it so curiously simulates the linear-leaved aquatic form of the *Ranunculus*. This linear-leaved form of *R. crassipes* was extremely abundant at Betsy Cove, and I gathered many specimens. At the lake at Christmas Harbour this form is also abundant, and grows mixed with the *Limosella*. Hence in hunting for *Limosella* without any very definite idea as to its appearance, I constantly overlooked it, thinking all that I saw to be the aquatic form of the *Ranunculus*. I think there must be some mistake about the antarctic species of *Ranunculus*. Two forms of *R. crassipes* appear to have been described as separate species. I think my specimens may show this. The only other plant besides *Limosella* and *Nitella* which appears to be local in Kerguelen is the *Uncinia*. I found this only in the one spot on Mount Bromley. The *Lomaria* supposed by you to be rare in

Kerguelen, is enormously abundant in Betsy Cove and about Royal Sound, forming large beds.

The insects we found at Kerguelen were two apterous flies, one as large as a housefly, the other almost as big as a blowfly, an apterous gnat (*Culex*) and a winged gnat, a small apterous (or rather very short-winged) moth, two or three beetles (*Curculio* and Staphylinidæ), and three or four spiders (*Saltici* and a *Trombidium*).

The moth I found crawling upon the beds of the little *Juncus*. The gnats are to be found about the dead seaweed &c. on the sea-shore. The larger fly nestles at the bases of the leaves of *Pringlea*, and lays its eggs in the fluid which is caught there. I never found it elsewhere; but there it is extraordinarily abundant, and every cabbage yielded ten or a dozen specimens. The fly creeps in a slow lazy manner. I am very sorry I did not observe whether it climbs to the inflorescence in sunshiny weather; perhaps this may be the case. This is an instance of one of those "neglected opportunities" to which you refer in the 'Flora Antarctica,' as so galling in the retrospect. Even at Heard [Yong] Island I found the same apterous fly nestling on *Pringlea* in abundance. Perhaps the two forms have some relation of mutual benefit.

On one *Pringlea* plant I found twenty-eight flower-stalks. Three were fresh, of the recent season's growth. The others appeared to belong, by their successive amount of decay, to eight preceding seasons. At Christmas Harbour all the *Pringlea* seed was unripe, whilst in the inner and sheltered parts of Royal Sound, towards the south of the island, a very large quantity was ripe.

The *Leptinella* forms immense and luxuriant beds of light bluish green, very conspicuous as seen from seawards on the coast round the rookeries of the shag (*Phalacrocorax carunculatus*), and everywhere thrives and luxuriates where the soil is enriched by dung. Hence also nearly all the old seal- and sea-elephant rookeries, so conspicuous from their hummocky appearance, are covered with *Leptinella*, which forms a soft bed for the very few of these beasts which yet remain.

* * * *

We dredged in sight of the Kermadecs all one day; but no landing was arranged. I was very much disappointed.

XXVIII. On the Diatomaceous Gatherings made at Kerguelen's Land by H. N. Moseley, M.A., H.M.S. 'Challenger.' By the Rev. E. O'Meara, M.A. Communicated by Dr. Hooker, Pres.R.S., V.P.L.S.

(Plate I.)

[Read April 15, 1875.]

The gatherings were seven in number—four from fresh water, two marine, and one from a freshwater lake within the reach of tidal influence.

No. 1. Pond at sea-level, Tristan d'Acunha. This gathering, as might have been anticipated, contained both freshwater and marine forms: of the latter, *Melosira moniliformis*, Kütz., abounded; and of the former there were numerous specimens of *Fragilaria virescens*, Ralfs, *F. capucina*, Desm., *Gomphonema tenellum*, Kütz., *Gomphonema intricatum*, Kütz.

No. 2. From a stream on the cliffs, Tristan d'Acunha. In this were found *Navicula viridis*, Nitzsh, *N. carussius*, Ehr., *Fragilaria capucina*, Desm., *F. virescens*, Ralfs, *F. æqualis*, Heiberg, *F. crotonensis*, Kitton.

No. 3. From a stream, Tristan d'Acunha. This gathering contained *Achnanthidium coarctatum*, Bréb., *Fragilaria virescens*, Ralfs, *Gomphonema calcareum*, Clene, *Navicula viridis*, Nitzsh, and *N. carassius*, Ehr.

No. 4. Small pond-streams, Marion Island. The forms found in this gathering were *Navicula carassius*, Ehr., *Diatoma grande*, Wm. Sm., both in great abundance, and also an undescribed species of *Gomphonema*, which I propose to distinguish as

GOMPHONEMA BICAPITATUM. Pl. I. fig. 1.

Frustules ·0018 in length. On front view cuneate, slightly arched on the margin. On the side view bicapitate. The attached end much smaller than the opposite; striæ fine, costate, radiate, reaching the median line.

No. 5. Small pond-streams, Marion Island. This gathering, though from a place similar to that of the preceding, is quite distinct, containing in abundance *Navicula carassius*, Ehr., *Fragilaria capucina*, Desm., *Diatoma grande*, Wm. Sm., and an undescribed species of *Diatoma* which I would name as

DIATOMA RHOMBICUM. Pl. I. fig. 2.

Frustules small, about ·0006 in length. On front view quadrangular, the costæ appearing as a narrow band of puncta. On side view rhombic; costæ very fine, previous.

No. 6. Marine, from surface of the water between Kerguelen and Herd Island. This is a very remarkable gathering, consisting, for the most part, of various species of *Chætoceros* with spines of extraordinary length aggregated in small masses of jelly-like appearance. In every instance the spines were broken off from the valves; so that it was difficult in many cases to ascertain the species; however, *Chætoceros peruvianus*, Bright, and *C. borealis*, Bail., were unmistakably present, and that in profusion. These species constituted by far the greater portion of the material; and mixed with them were found some specimens of *Hemiaulus antarcticus*, Ehr., *Rhizosolenia calyptra*, Ehr., *R. styliformis*, Bright, *R. imbricata*, Bright, and *R. setigera*, Bright.

Fragments of what appears to be an undescribed species of *Rhabdonema* occurred in great number; but although it would be remiss to omit reference to this form, the description cannot be regarded otherwise than as unsatisfactory. It was difficult to obtain a side view of the frustules; and when a filament was turned so as to bring the side view under observation, it appeared as if the valves had been detached from it. All that could be learned concerning these latter was that they must be circular or nearly so. Some few forms were found that seemed likely to correspond; they were ring-like, strongly costate; and in one or two cases I noticed specimens in which the central part was fractured, showing that what otherwise would have been considered a ring was really a continuous disk; possibly these may be the side view of the valve, which, if so, must be described as plain and destitute of striæ except at the margin. Three other forms appeared which seem not to have been previously described.

GOMPHONEMA ANTARCTICUM. Marine. Pl. I. fig. 3.

Frustules ·0022 in length. On front view cuneate, linear. On side view greatly wider at the upper than the lower end, cuneate; striæ fine, linear, slightly radiate, and interrupted in the middle by a narrow longitudinal unstriate band.

TEREBRARIA KERGUELENSIS. Marine. Pl. I. fig. 4.

Frustules united in a filament, adhering in pairs which present a lenticular outline; the striæ appearing, on the front view, in the form of large marginal puncta. Valves, on the side view elliptical-lanceolate; length ·0028; breadth ·0005; striæ moniliform, parallel, pervious.

ASTEROMPHALUS WYVILLE-THOMSONIANUS. Marine. Pl. I. fig. 5. Diameter ·0024. Primary rays broad, deep, extending from the centre to the margin, dividing the disk into six compartments, of which five are of the same dimensions, and the sixth double the breadth of the others, without any dividing line. The several compartments areolate, the five equal ones to the extent of one fifth of the diameter, the remaining compartment to the extent of one third of the diameter. Secondary rays seven, extending from the centre, five touching with their ends the middle points on the inner margin of the equal compartments, and two others much shorter and nearly parallel, terminating close together on the inner margin of the large areolate compartment.

This form, on first inspection, closely resembles in its general appearance *Asterolampra marylandica*, Ehr., var. β, as described by Wallich (Q. J. M. S. Jan. 1860, p. 47, pl. ii. fig. 18); but from the above description it will be evident that it differs not only specifically, but generically.

No. 7. Algæ from a surface-net put over when H.M.S. 'Challenger' was at anchor in Betsy cove, Kerguelen's Land, the net probably dragging on the bottom in the inlet.

It would appear from the presence of numerous forms of *Odontidium hyemale*, Lyng., that there was some discharge of fresh water in the immediate vicinity; but all the other forms were marine. The amount of Diatomaceous material in this gathering, it is to be lamented, was extremely small, supplying only a very few slides; but for the amount the forms were numerous, and of great interest.

The following is a list of the known species:—

Actinocyclus Ralfsii, W. Sm. (the disk is much larger and the areolation finer than that of other specimens observed elsewhere); *Cocconeis pacifica*, Grun.; *C. Scutellum*, Ehr., *C. regalis*, Grev.; *Coscinodiscus centralis*, Ehr.; *C. concavus*, Ehr.; *C. fimbriatus*, Ehr.; *C. perforatus*, Ehr.; *C. radiatus*, Ehr.; *C. radiolatus*, Ehr.; *C. subtilis*, Ehr.; *Eupleuria pulchella*, Arnott; *Grammatophora marina*, Lyng.; *G. serpentina*, Ehr.; *G. maxima*, Grun.; *Melosira subflexilis*, Kütz.; *Nitzschia panduriformis*, Greg., *Orthosira marina*, W. Sm.

Besides the above-named species, the following were found which do not seem to have been previously described:—

COSCINODISCUS MOSELEYI. Marine. Pl. I. fig. 6.
Frustule highly lenticular, of immense size, the diameter of the valve

being ·02, having a distinct large umbilicus consisting of about eight cuneate areoles, four large and four small. Areoles small, radiate, appearing in the dry valve irregularly quadrate, with an azure pustule in the middle of each. When mounted in balsam, roundish. Of equal size throughout. Closely arranged in fascicles, with about nine or ten rays in each at the margin, but the number decreasing towards the centre. The fascicles have an undulate appearance like the shell of the *Pecten*. Dry valve iridescent.

Many fragments of this form were found, some larger, some smaller; and but a few perfect valves. This form, so large that it would occupy too much space to figure completely, I have pleasure in naming after the gentleman to whose indefatigable explorations we are indebted for the gathering which contained it.

ACTINOCYCLUS OLIVERANUS. Marine. Pl. I. fig. 7.

Diameter of the valve ·0030; furnished with a narrow border of fine linear striæ, on the inner margin of which the valve is divided by eight equal elliptical undulations deeply shaded, with their crests directed towards the centre. Valves areolate; areoles small, roundish, arranged for some distance concentrically around the inner margin of each alternate undulation, until the lines of areoles reach the margin at the extremity of the next undulation at either side, and thence towards the centre linearly at an angle with the distinctly marked radius which strikes the middle point in the crest of the basal undulation. The centre is occupied by a few irregularly arranged areoles.

This very striking and beautiful form I name after Professor Oliver.

ACTINOCYCLUS CHALLENGERI. Marine. Pl. I. fig. 8.

Diameter of the valve ·0028. Furnished with a narrow border with small, close, punctate striæ; remainder of the disk areolate; areoles small, roundish, radiate, larger in the centre, and decreasing in size towards the margin.

Neither in this nor in the preceding species was there observable a submarginal nodule; so that with hesitation are they referred to the genus *Actinocyclus*, to which they otherwise would undoubtedly belong.

PIXIDICULA RADIATA. Marine. Pl. I. fig. 9.

Frustules large; breadth, on front view, ·0028; diameter of the valve ·0045. The valve is divided into three concentric portions; the central portion dark brown, unstriate, large, round which there is a light-fawn-coloured zone, with fine linear striæ. Into this zone project longer and shorter dark rays from the central boss, which are alternately arranged; outside this zone is a narrow fawn-coloured border finely striate. Observed in the front view, the outer edges of the two valves fit closely together without any intervening connective band.

GEPHYRIA DYERANA. Marine. Pl. I. fig. 10.

Length of frustule ·0088; breadth, on side view, ·0018. In front view the frustule is arched at the extremities, the intervening portion between nearly flat; margins marked with short linear striæ. On side view the valve is slightly arched, ends cuneate; costate striæ distributed in two series, separated by a strongly marked undulate line running from one end to the other in the middle of the valve, the costate pannels on the lower side of this line being alternate with those on the upper.

This species is considerably larger than any hitherto described; and I name it after Professor Dyer, to whose kindness I am indebted for the gratification of examining these very interesting collections.

XXIX. The Musci and Hepaticæ collected by H. N. MOSELEY, M.A., Naturalist to H.M.S. 'Challenger.' By WILLIAM MITTEN, A.L.S.

[Read April 15, 1875.]

TENERIFFE.

ENTOSTHODON TEMPLETONI (*Hook.*).

A single fertile and a few young stems.

MNIUM ROSTRATUM, *Schrad.*

Small barren stems.

M. UNDULATUM, *Hedw.*

In the same state.

HYPNUM ILLECEBRUM, *Schwaegr.*

A few fragments without fruit.

POGONATUM ALOIDES, *Hedw.*

Specimens complete, with fruit.

POLYTRICHUM PILIFERUM, *Schreb.*

Barren.

SOUTHBYA STILLICIDIORUM (*Raddi*).

Without fruit. Growing on earth.

CALYPOGEIA TRICHOMANIS (*Spreng.*).

A few fragments only.

FIMBRIARIA AFRICANA, *Mont.*

Fertile.

BERMUDA.

EUCLADIUM VERTICILLATUM (*L.*).

Without fruit.

TORTULA (TRICHOSTOMUM) BERMUDANA, *Mitt.*

Dioica. Caulis humilis infra perichætiumi nnovans. Folia a basi erecta rotundo-quadrata cauli appressa cellulis parvis oblongis pellucidis areolata exinde erecto-patentia stricta sensim angustata canaliculata apice obtusiusculo, nervo in mucronulum excurrente, margine integerrimo supra medium incurvo inflexove, cellulis minutis rotundis obscuris, perichætialia pauca basi ovalia cæteroquin caulinis similia. Theca in pedunculo flavo ovali-oblonga erecta operculo triente breviore. Calyptra ad medium usque thecæ descendens. Peristomium e dentibus geminatis filiformibus rubris.

In extensive patches on calcareous sand.

Caulis lineas quatuor altus gracilis. Folia flavo-viridia ætate pallide fusca sicca incurvata laxe contorta. Pedunculus subsemiuncialis gracilis. Theca ætate fusca ore intensiore colorato.

Not unlike some states of *Weissia controversa*; but the capsules are not striated when old, and the leaves are shorter and wider.

T. MELANOCARPA, *Mitt.*

Monoica. Caulis brevissimus simplex. Folia patentia recurvave liguliformia obtusa, nervo crassiusculo sub apice evanescente, margine cellulis prominulis crenulata, cellulis superioribus rotundatis parietibus crassiusculis basalibus oblongis hyalinis utrinque ad margines altius ascendentibus areolata. Theca in pedunculo nigro-fusco elliptico-cylindracea operculo recto subulato dimidium thecæ longitudinis, peristomio dentibus erectis angustis basi brevissime coalitis, annulo composito.

On calcareous matter.

Caulis lineam altus. Folia semilineam longa fuscescentia, siccitate parum mutata. Pedunculus trilinearis.

Closely resembling *Trichostomum brevicaule*, Hampe, but with leaves not narrowed at their bases, and having there a larger space occupied by the pellucid cells.

BRYUM DICHOTOMUM, *Hedw.*

A few barren stems with *Tortula bermudana*.

RHACOPILUM TOMENTOSUM, *Brid.*

In very small quantity, with fruit.

ISOPTERYGIUM TENERUM, *Sw.*

In fruit.

CEPHALOZIA CONNIVENS (*Dicks.*).

Fragments with *Aneura palmata.*

PLEUROSCHISMA PROSTRATA, *Sw.*

ANEURA PALMATA (*Hedw.*).

Without fructification.

OTIONA AITONIA (*Nees ab E.*).

Barren.

DUMORTIERA HIRSUTA (*Sw.*).

Fertile.

TRISTAN D'ACUNHA.

CYNONTODIUM CONICUM (*Mont.*).

Tall stems, without fruit, appearing to be the same as the Chilian species.

CAMPYLOPUS INTROFLEXUS (*Hedw.*).

Fertile, in a very small and short state, growing on the earth.

C. ARCUATUS, *Brid.*

Barren, with a tall state of the preceding associated with *Bartramiæ*; in coarse sand.

CERATODON PURPUREUS (*Linn.*).

One or two fertile stems amongst *Marchantia.*

GRIMMIA (DRYPTODON) MEMBRANACEA, *Mitt.*

Compacte cæspitosa. Folia sicca arcte appressa, humida patentia, lanceolata ovato-lanceolataque sensim acuta, apicibus sæpe brevissime hyalinis, margine recurva, nervo canaliculato in apicem evanescente carinata, cellulis parietibus ubique interruptis areolata; perichætialia dimidio breviora ovata obtuse acuta. Theca in pedunculo brevi ovalis operculo subulato, peristomio pallido, annulo composito.

On rocks.

Caulis uncialis ramosus. Folia juniora viridia, seniora fuscata. Pedunculus sesquilinearis pallidus. Theca evacua brevior ovalis pallide fusca membranacea.

Similar to *G. symphyodon*, C. Müller, but with the leaves at the apex not contracted into an apiculus.

WEISSIA (HYMENOSTYLIUM) CALCAREA, *Nees et Hornsch.*

Barren stems scattered amongst *Bryum megalacrion.*

MACROMITRIUM ACUTIRAMEUM, *Mitt.*

Caulis repens ramis brevibus ramosis in cæspitem depressum congestis. Folia ramea patentia siccitate in spiram contorta ad ramorum apices in cuspidem acutam torta, lanceolata apicem versus latiuscula et in apiculum acuminata, nervo in plica carinæformi sepulta sub apice evanescente, margine a basi usque ad folii medium anguste reflexa integerrima cellulis superioribus minutis rotundatis inter se distinctis, basin versus oblongis parvis limitibus latis areolata.

Caulis ubique ramis semiuncialibus cum foliis densis crassitudine circiter lineam metientibus obtectus. Folia juniora viridia mox fuscescentia lineam longa.

BARTRAMIA (PHILONOTIS) CAPILLATA, *Mitt.*

Dioica. Caulis humilis. Folia plumosa erecto-patentia a basi sublanceolata sensim angustissime attenuata, nervo dorso denticulis scabro excurrente carinata, margine serrulata, cellulis parvis oblongis areolata; perichætialia ovato-lanceolata tenuiacuminata. Theca in pedunculo elongato rubro globosa obliqua plicata, peristomii dentibus externis internisque rubris. Flos masculus gemmiformis foliis a basi erecta dilatata vaginante crocea sensim angustatis patulis, nervo debiliore haud excurrente, cellulis longioribus areolatis.

On wet sandy earth.

Caulis unciam brevior cum foliis lineam angustior. Folia lineam longa viridia stramineaque obscura, perigonialia minus obscura. Pedunculus unciam altus. Theca, unica visa, satis magna ore parvo.

B. (PLAGIOMELA) RADICOSA, *Mitt.*

Caulis elongatus radicellis rufis. Folia a basi erecta obovato-oblonga, cellulis angustis hyalinis areolata, subito longe subulato-angustata patentia, margine argute serrulata, cellulis parvis angustis nervoque ubique papillis obscura.

Growing in loose tufts in coarse sand.

Caulis biuncialis. Folia 3-linearia, superiora æruginoso-viridia subglauca, inferiora fusca, omnia in acumen crassiusculum nec capillare attenuata.

Like *B. vulcanica*; but in that the leaves are attenuated into long hair-like points. *B. commutata*, Mitt., differs also in the same particular.

B. INCONSPICUA, *Mitt.*

Humilis. Folia erecto-patentia patentiaque lanceolata sensim augustata, nervo scabro percursa, margine argute serrulata inferne vix recurva,

cellulis basi paucis elongatis superioribus rotundatis obscuris papillosis areolata. Caulis 3–4 lineas altus. Folia bilinearia æruginoso-viridia rigida.

Smaller than *B. Breutelii*, and different in the margin of the leaf not being reflexed.

BRYUM TRUNCORUM, *Brid.*

Without fruit.

B. MEGALACRION, *Schw.*

In extensive patches, with old fruit.

B. JULACEUM, *Sm.*

A few scattered barren stems.

DALTONIA ——?

A single fragment of some species.

STEREODON CUPRESSIFORMIS (*Linn.*).

Barren.

PTYCHOMNION DENSIFOLIUM (*Brid.*).

Without fruit.

HYPNUM (PLEUROPUS) BONPLANDII, *Hook.*

One small barren plant.

H. (RHYNCHOSTEGIUM) RAPHIDORRHYNCHUM, *C. Mueller.*

A few barren stems appear to belong to this.

THUIDIUM CURVATUM, *Mitt.*

Small barren stems.

FISSIDENS ASPLENIOIDES, *Sw.*

Barren.

EUSTICHIA LONGIROSTRIS, *Brid.*

Short barren stems are frequent amongst other mosses.

POLYTRICHUM JUNIPERINUM, *Hedw.*

With fruit.

JUNGERMANNIA COLORATA, *Lehm. et Lindenb.*

In large patches without fruit.

PLAGIOCHILA INFUSCATA, *Mitt.*

Caulis gracilis. Folia inter se remotiuscula rigidula siccitate immutata distiche explanata patentia ovato-oblonga breve ovalia oblongave planiuscula, margine dorsali integerrima subrecta, ventrali dentibus parvis circiter sex serrata apice subbidentata, cellulis rotundis areolata.

On earth or rocks.

Caulis triuncialis rigidulus fuscus cum foliis lineam latus. Folia olivaceo-viridia fuscescentia ubique æqualiter inter se disposita.

LOPHOCOLEA SERRATA, *Mitt.*

A few minute fragments, barren.

L. INCONSPICUA, *Mitt.*

Pusilla. Caulis procumbens parum divisus. Folia explanata sursum secundave ovali-orbiculata apice rotundata truncata interdum sinu obtuso bidentata, cellulis rotundatis interstitiis carnosulis areolata. Amphigastria parva bifida. Folia involucralia majora concava convoluta integerrima, amphigastrio ovali apice bidentato. Perianthium ovatum subtruncatum apice eroso triplicato.

On the earth amongst *Bryum megalacrion.*

Caulis semiuncialis cum foliis semilineam latus. Folia siccitate parum mutata fusca. Perianthium a foliis involucralibus ultra medium obtectum.

CHILOSCYPHUS LUCIDUS, *Mitt.*

Caulis procumbens ramosus. Folia explanata divergentia oblonga apice rotundata sinuve parvo obtuso plus minus distincto bi- rarius tridentata, cellulis amplis rotundo-hexagonis pellucidis parietibus angustis firmis areolata. Amphigastria caulis latitudine brevia quadridentata. Perianthium obconicum superne trigonum. Folia involucralia minora conformia appressa amphigastrio caulinis simili.

On the earth.

Caulis inter muscos suberectus semiuncialis cum foliis lineam latus. Folia juniora pallide obscureque viridia nigro-fuscescentia e substantia crassiuscula. Perianthium parvum.

LETHOCOLEA PROSTRATA, *Mitt.*

Caulis prostratus radicellis pallidis ad terram affixus simplex. Folia explanata divaricata imbricata late ovalia planiuscula obtusa integerrima, e cellulis rotundis parietibus carnosulis areolata.

Caulis unciam brevior cum foliis sesquilineam latus sæpe autem angustior. Folia ceraceo-viridia obscura.

Very similar to *L. Bustillosii,* Mont. in Fl. Chilens. Crypt. t. *b,* f. 1, but appears to have the areolation of its leaves composed of larger cells.

LEPIDOZIA PROCUMBENS, *Mitt.*

A few small plants amongst mosses.

LEJEUNIA PARASITICA, *Tayl.*

A few stems without fruit creeping on *Grimmia membranacea.*

PALLAVICINIUS PROCUMBENS (*Tayl.*).

Barren stems of some species, probably this, are creeping amongst *Bryum megalacrion.*

ANTHOCEROS LÆVIS, *Linn.*

With fruit.

ASTERELLA HEMISPHÆRICA, *Beauv.*

With imperfect fruit.

MARCHANTIA POLYMORPHA, *Linn.*

Without fruit.

INACCESSIBLE ISLAND.

PHYSCOMITRIUM (APHANORHEGMA) BREVISETUM, *Mitt.*

Caulis innovationibus repetitis dichotome ramosus. Folia superiora obovato-oblonga acuta brevissime apiculatave, nervo ante apicem evanido, margine versus apicem serrulata, cellulis hexagono-oblongis versus folii apicem brevioribus areolata. Theca in pedunculo brevi globoso-pyriformis ore truncato magno, operculo perfecte conico. Calyptra longirostris basi plurifida laciniis ad operculi basin descendentibus.

On earth.

Caulis $\frac{1}{4}$–$1\frac{1}{2}$ unciam altus. Folia $1\frac{1}{2}$–2-linearia satis firma viridia. Pedunculus semilineam longus.

Differs from its congeners in the large exactly conical operculum.

BRYUM TRUNCORUM, *Brid.*

Barren.

KERGUELEN'S ISLAND.

CYNONTODIUM AUSTRALE, *Mitt. Musc. Austr. Amer.* 42.

In the descriptions of this species it is omitted that when dry each leaf is spirally twisted.

BLINDIA MICROCARPA, *Mitt.*

Monoica. Pulvinate cæspitosa. Caulis dichotomus fastigiatim ramosus. Folia patentia stricta plus minus falcato-curvatave dimidio inferiore lanceolato superiore carinato anguste attenuato integerrima nervo angusto percursa cellulis alaribus in auriculam parvam dispositis fuscis reliquis elongatis angustis; perichætialia brevia parva ovata convoluta in acumen subulatum producta. Theca in pedunculo gracili foliis caulinis dimidio breviore erecta parva ovalis, operculo subulato demum ore dilatato cyathiformis fusca, peristomii dentibus teneris. Calyptra parva dimidiata. Flos masculus foliis propriis perichætialibus similibus inclusus.

Caulis subuncialis. Folia trilinearia sicca subcurvata parum mutata vix nitida. Pedunculus lineam longus.

CAMPYLOPUS APPRESSIFOLIUS, *Mitt. Musc. Austr. Amer.*

In dense tufts, without fruit.

DICRANUM PUNGENS, var. LUCIDUM, *Hook. f. et Wils.*

Barren.

D. (ISOCARPUS) TORTIFOLIUM (*Hook. f. et Wils.*).

With perfect fruit.

CERATODON PURPUREUS (*Linn.*).

Barren.

GRIMMIA (DRYPTODON) CHLOROCARPA, *Mitt.*

Without fruit.

TORTULA SERRULATA, *Hook. et Grev.*

A few barren stems.

T. ERUBESCENS, *Mitt., Hook. Handb. New Zealand Flora,* ii. 421 (Didymodon).

A few plants with immature capsules.

STREPTOPOGON AUSTRALIS, *Mitt.*

Folia inferiora patentia spathulato-ligulata obtusiuscule acuta, nervo in apice desinente margine apicem versus denticulata; superiora duplo latiora a basi erectiore sensim recurva patentia apice cum nervo in acumen longitudinis variabilis sensim educto, margine superne serrulata.

Two small fragments are all yet seen; but the species must be very different from *S. mnioides,* Schw., there being no trace of the limb bordering the leaves.

ORTHOTRICHUM CRASSIFOLIUM, *Hook. f. et Wils.*

Complete specimens with fruit.

O. ATRATUM, *Mitt.*

Monoicum. Caulis humilis cæspitosus. Folia patentia sicca incurva laxe contorta lanceolata apice lata obtusiuscule acuta, nervo sub summo apice evanescente, cellulis fere ubique parvis rotundatis obscuris; perichætialia majora. Theca in pedunculo longitudine perichætii subæquali ovalis lævis sicca infra os contracta, inferne collo crasso, operculo convexo rostro angusto, peristomii dentibus 16 vel plus minus cohærentibus 8. Calyptra magna fusca calva ad medium usque thecæ descendens.

Caulis subsemiuncialis. Folia lineam longa juniora pauca viridia reliqua nigra. Theca straminea subcarnosa.

Differs from *O. crassifolium* in its leaves being twice as wide, less dense and opaque in areolation. The peristome in some capsules is in sixteen equal teeth, in others partly coherent into eight.

ZYGODON BROWNII, *Schw.*

Minute fragments, indicating the presence of this or some other species.

BARTRAMIA (EUBARTRAMIA) ROBUSTA, *Hook. f. et Wils.*

Without fruit.

B. (EUBARTRAMIA) PATENS, *Brid.*

With fructification.

B. (BREUTELIA) PENDULA, *Hook.*

Barren.

BRYUM (WEBERA) NUTANS, *Schreb.*

With perfect fruit.

B. (WEBERA) ALBICANS, *Wahlenb.*

Barren.

B. (WEBERA) CRUDUM, *Hedw.*

Also barren.

B. (ECCREMOTHECIUM) PENDULUM, *Hornsch.*

Tall specimens with complete fructification.

B. KERGUELENSE, *Mitt.*

Monoicum. Caulis brevis ramosus. Folia erecto-patentia imbricata inferiora rameaque ovali-lanceolata acuta carinato-concava nervo rubro percursa, margine integerrimo, cellulis angustioribus in seriebus duabus limbum subindistinctum formantibus reliquis suboblongis, comalia longiora latioraque, perichætialia interna minora. Theca in pedunculo breviusculo rubro superne flexuoso curvato horizontalis tenui-membranacea nitida, sporangio ovali, collo recto æquilongo sensim angustato, ore satis parvo coarctato, operculo convexo apice brevissime acuto, peristomii dentibus pallidis interni fragmentis externo usque ad medium adhærentibus.

Caulis trilinearis crassitudine cum foliis lineam haud excedens. Folia

pallide viridia subnitida fusco-nigrescentia. Pedunculus quadrilinearis. Theca cum ejus collo sesquilinearis fulva. Flos masculus in innovationem brevem terminalis.

MIELICHHOFERIA CAMPYLOCARPA, *Hook. et Arn.*

Fruit plentiful, but not well perfected.

AMBLYSTEGIUM DECUSSATUM, *Hook. f. et Wils.*

A slender state without fruit.

A. UNCINATUM, *Hedw.*

Barren.

SCIAROMIUM CONSPISSATUM (*Hook, f. et Wils.*).

A short barren state.

HYPNUM (BRACHYTHECIUM) SUBPILOSUM, *Hook. f. et Wils.*

Without fruit.

PSILOPILUM TRICHODON, *Hook. et Wils.*

Stems short, but with perfect fruit.

ANDREÆA ACUMINATA, *Mitt.*

A few mature capsules are on the specimens.

PLAGIOCHILA HETERODONTA, *Hook. f. et Tayl.*

With *Grimmia* (*Drypt.*) *chlorocarpa.*

LEIOSCYPHUS PALLENS, *Mitt.*

Caulis procumbens ascendensque ramosus. Folia sursum secunda conniventia imbricata orbiculata caviuscula integerrima, cellulis rotundis parietibus crassiusculis areolata. Amphigastria erecto-patentia lanceolata profunde bifida laciniis elongatis subulatis. Perianthium obovatum ore truncato integerrimo.

Caulis uncialis sesquiuncialisve cum foliis ½ lineam latus. Folia pallide olivaceo-viridia fuscescentia. Amphigastria semilineam longa.

TEMNOMA QUADRIPARTITA (*Hook.*).

A few minute scraps with other Hepaticæ.

JUNGERMANNIA COLORATA, *Lehm. et Lindeb.*

Common amongst mosses; a few stems with perianths.

J. LEUCORHIZA, *Mitt.*

Caulis procumbens radicellis pallidis. Folia laxe inserta quadrata subrotundave sinu acuto obtusove bilobata interdum lobo altero minore, lobis acutis obtusisve incurvis, cellulis rotundatis et ovali-hexagonis areolata.

Caulis subuncialis, cum foliis ½ lineam latus. Folia viridia pallide fuscescentia.

Not unlike small states of *J. ventricosa.*

MARSUPIDIUM EXCISUM, *Mitt.*

Caulis primarius repens exinde ascendens pallidus. Folia inferiora minora sensim superne magnitudine increscentia et exinde in caulem productum iterum minora, omnia oblongo-quadrata concava sinu obtuso bidentata integerrima, lobis latis acutis incurvis.

Caulis repens rhizomatiformis, ascendens unciam altus vel interdum longior, flagelliformi-productus. Folia viridia carnosula cellulis hexagonis parietibus angustis.

GYMNOMITRIUM ATRICAPILLUM, *Hook. f. et Tayl.*

In densely interwoven patches.

DIPLOPHYLLUM DENSIFOLIUM (*Hook.*).

Dark brown in colour and without fruit.

LEMBIDIUM VENTROSUM, *Mitt.*

Caulis erectus? arcuatus crassus carnosus, flagella ex amphigastriorum angulis emittens. Folia inferiora remota superiora majora, insertione fere verticalia, patentia, apicem caulis versus imbricata, rotundata profunde concava apice rotundata sinuve subindistincto subretusa, cellulis satis parvis parietibus angustis areolata. Amphigastria parva cauli appressa triangularia apice subemarginata. Perianthium in ramo brevi superne valde incrassato foliis amphigastrioque involucralibus convolutis ovatis apice breviter bi–tridenticulatis.

In extensive patches; when dry, of a pale brownish green.

Caulis lineas quatuor altus cum foliis semilineam latus vel angustior, pallidissime viridis fere albidus. Ramus fertilis cum foliis sesquilinearis.

HERPOCLADIUM FISSUM, *Mitt.*

Caulis firmus crassiusculus. Folia alterna patentia ovata obtusa apice incurva sinu parvo acuto breviter bidentata concava, basi utroque caulem ad medium tegentia, margine dorsali interdum flexura sinuata rarius unidentata, cellulis densis obscuris areolata. Amphigastria foliis similia patula divaricatave apice integra obtusa.

A few small fragments amongst *Leioscyphus pallens.*

In its apparently trifarious leaves similar to *H. bidens,* Mitt., and to *H. tenacifolium,* Hook. f. et Tayl., but smaller.

SYMPHYOGYNA PODOPHYLLA, *Thunb.*

Specimens all without fruit.

MARCHANTIA POLYMORPHA, *Linn.*

Barren.

MARION ISLAND.

CYNONTODIUM AUSTRALE, *Mitt.*

Fruit past maturity.

DICRANUM (ISOCARPUS) ANTARCTICUM (*C. Mueller*).

A few stems with unripe fruit appear to belong to this species; they were growing in a tuft of *Jungermannia colorata* (Hedw.).

CAMPYLOPUS INTROFLEXUS (*Hedw.*).

Barren.

C. CAVIFOLIUS, *Mitt. Musc. Austr. Amer.* 87.

Also without fruit, in dense tufts.

GRIMMIA (DRYPTODON) CHLOROCARPA, *Mitt.*

Without fructification.

G. (RHACOMITRIUM) LANUGINOSA, *Dill.*

Tall stems, without fruit.

APALODIUM AUSTRALE (*Hook. f. et Wils.*).

With fruit not quite mature.

ENTOSTHODON LAXUS (*Hook. f. et Wils.*).

A single stem with young fruit and two or three barren plants.

BARTRAMIA (PHILONOTIS) TENUIS, *Tayl.*

Without fruit.

B. (PHILONOTIS) REMOTIFOLIA (*Hook. f. et Wils.*).

In extensive patches, with perfect fruit.

B. (GLYPHOCARPUS) QUADRATA, *Hook.*

Tall slender stems without fruit, amongst other mosses.

B. (BREUTELIA) DUMOSA, *Mitt.*

Sterile.

BRYUM PENDULUM, *Hornsch.*

Without fruit.

B. LÆVIGATUM, *Hook. f. et Wils.*

Also sterile; but in fine state.

MIELICHHOFERIA TENUISETA, *Mitt.*

In luxuriant growth, with immature fruit.

DISTICHOPHYLLUM FASCICULATUM, *Mitt.*

Monoicum. Caulis debilis erectus fasciculatim ramosus ruber. Folia compressa omnia conformia, lateralia patentia, oblongo-ovalia obtusa, apiculo brevissimo sæpius obsoleto terminata planiuscula, nervo tenui ultra medium evanido, limbo e triplici serie cellularum angustissimarum marginata integerrima, cellulis hexagonis limpidis areolata; perichætialia erecta interna late ovalia convoluta apice acuta subserrulata immarginata enervia. Theca in pedunculo elongato rubro lævi erecta ovalis, collo sensim angustato.

Growing in a tufted manner intermixed with *Jungermannia colorata.*

Caulis uncialis biuncialisve cum foliis lineam latus. Folia pallide stramineo-fusca sicca vix compressa marginibus flexuosis. Pedunculus unciam brevior.

Like *D. sinuosum*, but with cells twice as large and an erect capsule.

D. IMBRICATUM, *Mitt.*

Caulis rubro-fuscus fasciculatim ramosus erectus. Folia concava fere teretiuscule imbricata, ad ramorum apices in gemmam subacutam congesta, ovali-oblonga acuta apiculo parvo terminata, limbo e duplici serie cellularum angustissimarum marginata, nervo angusto ultra medium evanescente, cellulis limpidis hexagonis areolata.

In a scattered manner amongst *Gottschea carnosa.*

Caulis semiuncialis cum foliis vix compressis lineam latus.

Similar to *D. flaccidum*, but with acute leaves which at the apices of the stems are imbricated in a cuspidate manner.

PLAGIOTHECIUM ANTARCTICUM, *Mitt.*

Monoicum, cæspitosum, ramis ascendentibus. Folia compressa subfalcata nitida, caulina ovata acuminata integerrima enervia, ramea ovato-lanceolata tenuiter acuminata subenervia, omnia basi subcordata, cellulis angustis elongatis areolata; perichætialia convoluta late ovata breviter acuminata. Theca in pedunculo elongato rubro ovalis inæqualis suberecta inclinatave operculo breviter conico peristomio interno ciliis in unum coalitis inter processus carinatos dentium longitudinis impositis in membranam usque ad dimidiam dentium longitudinem insidentibus.

Habitus adspectusque omnino *P. pulchelli*, foliis autem basi ad insertionem subcordatim dilatatis.

STEREODON CUPRESSIFORMIS, *Linn.*

A few barren stems.

ACROCLADIUM POLITUM (*Hook. f. et Wils.*).

Small fragments attached to the lower parts of *Grimmia lanuginosa.*

AMBLYSTEGIUM DECUSSATUM, *Hook, f. et Wils.*

A slender state, unlike the larger New-Zealand forms; but the substance of the leaves is not different.

HYPNUM (BRACHYTHECIUM) SUBPILOSUM, *Hook. f. et Wils*

Without fruit.

EUSTICHIA LONGIROSTRIS, *Brid.*

Barren.

PSILOPILUM AUSTRALE, *Hook. f. et Wils.*

Male plants only.

JUNGERMANNIA COLORATA, *Lehm. et Lindenb.*

In large tufts with perfect fruit.

PLAGIOCHILA MARIONENSIS, *Mitt.*

Caulis erectus flexuoso-curvatus innovationibus continuus, ramis erectis fasciculatim ramosus. Folia erecto-patentia plus minus cauli appressa angulo apicali exteriore recurvo latissime ovata subrotunda, margine ventrali dentibus latis brevibus, dorsali integerrima, cellulis rotundis areolata. Amphigastria patula divaricatave lanceolata integra furcatave fragilia sæpe obsoleta. Folia involucralia toto ambitu validius dentata. Perianthium ovatum compressum ore parvo truncato crenulato.

Caulis usque ad altitudinem quadriuncialem ascendens, cum foliis lineam latior, fuscus. Folia pallide viridia mox pallide fusca, firmiuscula, sicca parum mutata. *P. retrospectanti* habitu similis.

LOPHOCOLEA PALLIDE-VIRENS, *Hook. f. et Tayl.*

In small quantity amongst mosses.

L. NOVÆ-ZEALANDIÆ, *Nees ab E.*

Without fruit.

GOTTSCHEA CARNOSA, *Mitt.*

Caulis ascendens crassus pallidus carnosus. Folia patentia laxe imbricata lobo ventrali obovato obtuso, dorsali dimidiato obovato usque fere ad apicem lobi ventralis producto basi cum lobo opposito imbricato caulem tegente margine alæformi lobi ventralis infra medium lineæ conjunctionis desinente, ubique integerrima carnosula lævia. Amphigastria lunulata cauli appressa.

Caulis uncialis biuncialisque simplex furcatusve sesquilineam crassus cum foliis lineas tres latus, latere ventrali radicellis brevibus fuscis. Folia pallide ceraceo-viridia, seniora pallide fusca.

Near *G. pachyphylla*, but different in the rounded apices of its leaves.

LEPIDOZIA LÆVIFOLIA, *Hook. f. et Tayl.*

Small barren stems with the *Gottschea* and among mosses.

HEARD ISLAND.

CERATODON PURPUREUS (*Linn.*).

In a small starved and blackened state, barren.

GRIMMIA (SCHISTIDIUM) INSULARIS, *Mitt.*

Monoica. Pulvinato-cæspitosa. Folia patentia siccitate subfalcatim curvata lanceolata subulato-angustata superne carinata integerrima nervo crassiusculo percursa cellulis superioribus rotundis obscuris basalibus ad nervum angustis elongatis ad angulos oblongis rectangulis hyalinis; perichætialia erecta convoluta ovali-elliptica acuminata cellulis basalibus oblongis angulatis, superioribus parvis oblongis rotundisque intermixtis. Theca immersa subrotunda ore amplo, operculo conico-acuminato, peristomio dentibus brevioribus.

G. maritimæ statura habituque simillima sed foliis apice angustiore acuminatis et basi cellulis diversiformibus areolatis margine nullibi recurvis.

BARTRAMIA ROBUSTA, *Hook. f. et Wils.*

A small state of what appears to be this species is intermixed with *Ceratodon purpureus.*

FOSSOMBRONIA AUSTRALIS, *Mitt.*

Caulis prostratus radicellis purpureis. Folia subquadrata angulata margine flexuosa antice incurva, sporis margine echinatis.

The specimens gathered by Mr. Moseley are without fruit, but aypear to belong to a species common in New Zealand and Tasmania, which in size agrees with *F. angulosa*, Raddi, but has more the habit of *F. pusilla*, to which last they have been usually referred.

XXX. Notes on Plants collected and observed at the Admiralty Islands, March 3 to 10, 1875. By H. N. MOSELEY, Esq., M.A.

[Read December 16th, 1875.]

THE Admiralty Islands are a group consisting of one large island and numerous small ones. The group lies between latitudes 1°50′ S. and 3° 10′ S., and longitudes 146° E. and 148° 6′ E. It forms the north-westerly termination of the long curved chain of large islands and groups of islands which, stretching roughly N.E. and S.W., is composed of the New-Ireland, Solomon, and New-Hebrides groups. The larger island of the Admiralty group is distant from New Hanover, the nearest large island of the chain, about 130 miles, and from the nearest point of New Guinea about 150 miles. A series of groups of small islands form connecting links between the Admiralty group and New Guinea; and a number of the smaller islands of the Admiralty group lie between the large island and New Hanover. The centre of the large or main island is placed by D'Entrecasteau in lat. 2° 18′ S. and long. 146° 44′ E. The island, which is oblong in form, is about fifty miles in extreme length, and sixteen in extreme breadth. It has, together with its immediately adjacent islets, an area of about 550 square miles. The main island is mostly of small elevation, but contains mountain-masses rising to a height of about 1600 feet, which were visible to the eastward of the anchorage of the 'Challenger' in Nares Anchorage. The examination of the islands made by us was confined to the extreme north-western portion of the northern coast of the main island, in the neighbourhood of Nares Bay, and to the numerous small outlying islands which, lying just off the coast, shelter that anchorage.

The land-surface in the vicinity of Nares Bay consists of a series of low irregular ridges rising one above another, with wide flat expanses at the heads of bays on the coast, which are scarcely or not at all raised above sea-level, and thus are in a swampy condition. The mountains appear, from their form, to be volcanic; and it is probable that the obsidian used by the natives for their spear-heads is procured in them. A trachytic lava was found to compose one of the outlying islands; and a similar rock was observed on the mainland where it commenced to rise. A platform of coral-sand rock forms the coast-line of the main island in many places; and a similar rock is the only component of most of the small outlying islands.

From the position of the Admiralty Islands with regard to the equator, their climate is necessarily an extremely damp one. A great deal of exceedingly heavy rain fell during the stay of the 'Challenger.' Rain fell on five days of the seven during which we were at Nares Anchorage, the total fall being 1·66 inch. The temperature of the air ranged between 86° and 75°·5 F., the mean of maximum and minimum observations being about 80° F.; and the air was loaded with moisture. Dense clouds of watery vapour hung about the forest-clad ranges, keeping the mountains most frequently concealed; and in the evenings clouds of mist hung about the lower land, looking like smoke rising from between the densely packed trees. In a bay some miles to the eastward of the anchorage of the 'Challenger,' the mouth of a small river, apparently the outlet of the drainage of the mountains on this side, was found, and also a very small brook; but running water was not elsewhere observed, and the rain probably drains to a large extent into the swamps.

The main island, as viewed from seawards, is seen to be densely wooded everywhere. Along the summits of the ridges cocoa-nut palms show out against the sky, accompanied by areca palms, as can be made out on a nearer view. The general dark-green mass of vegetation on the hill-sides is festooned with creepers, and shows a peculiar horizontal banding of somewhat lighter green, due to the presence in abundance of a leguminous tree (*Acacia* ?), which has its branches and leaves spread in a succession of horizontal layers, contrasting strongly with the general mass of more vertically directed foliage. A closely similar appearance strikes the eye at first sight on viewing the vegetation of the Banda Islands. The tree producing the effect is probably the same in both cases Unfortunately, of this, as of all the other high trees, no specimens were procured.

The smaller outlying islands dotted about in front of the main island are all thickly wooded. The inhabited ones are distinguished at once by the large number of cocoa-nut trees growing upon them and forming the main feature of their vegetation.

In several points of the coast there are mangrove-swamps, in one of which I collected three species of mangroves. Where the land rises a little higher, so as not to be constantly overflowed by the tide, there is a sandy beach; and the shore is lined by various littoral trees, amongst which a *Barringtonia* and a tree* with oval leaves and a pear-shaped fruit with a stony kernel (*Calophyllum inophyllum*) are the most frequent. The trees overhang the sea with immense horizontal branches; and the bases of many of the trees are constantly washed by the waves, but nevertheless have large woody fungi growing upon them, sometimes so low down as also to be frequently immersed. The overhanging branches are loaded with epiphytes, all growing thus suspended over the sea, so that I had to wade up to my middle in order to gather many of them. Amonst these epiphytes are several species of orchids, five or six of which were found in flower or fruit, and a plant with woody stem and flowers sessile upon it with succulent bright pink calyces*. Growing with these is a *Hymenophyllum* in profusion, forming continuous sheets of green, a *Niphobolus*, and a *Lygodium*, which twines round the branches in all directions; whilst a *Psilotum* and the long light-green pendent fronds of *Ophioglossum pendulum* hang down from the branches in bunches. Further, a nearly white moss [? *Leucophanes*, sp.] forms large, rounded, compact cushions conspicuous amongst the darker green of the other plants, and reminding me in its habit of antarctic rather than tropical vegetation. *Asplenium nidus* throws up its crowns of fronds in all directions from the branches in great abundance; and the curious inflated boles of a *Hydnophytum*†, many of them as much as 1¼ foot in diameter, are perched all about in the forks. I saw no specimens of *Myrmecodia armata*, which occurs so commonly with *Hydrophytum* in Aru and the Moluccas. The kind of littoral vegetation just described was seen best developed at Wyville Point.

---

* On the small Observatory Island it is the only tree, except a *Pandanus* and a young *Barringtonia* 1 foot high, the fruit of which has drifted up and germinated. The roots of this tree are gnawed by a terrestrial Pagurid (*Cœnobita*) which inhabits the small islands in abundance; twenty or thirty of these crabs were to be seen gnawing at one long wound in a root, apparently feeding on an exuding gum.

At another part of the coast, in the vicinity of the small river, where the shore, being less sheltered and exposed to a heavy surf, is not encroached upon to its verge by large trees, several common littoral tropical plants occurred which were not found elsewhere:—a small trailing bean with yellow flower [*Vigna lutea*]; a yellow-flowered composite usually herbaceous, but here in places forming a woody shrub; the large *Crinum* so abundant on the shores at Aru in the Philippines; and *Ipomæa pes-capræ*, which, curiously enough, was nowhere very abundant. Three species of *Pandanus* grew here also, together with a *Casuarina* (*C. equisetifolia*) and a white-flowered apocynaceous tree with chocolate-coloured ovoid fruits and an abundant milky juice (*Cerbera*?).

In Nares Anchorage, not very far from our anchorage and close to the main island, a small thickly wooded island (Pigeon Island) is inhabited by immense numbers of a fruit-pigeon (*Carpophaga*

---

* [Perhaps a *Medinilla*, but specimens not identifiable.—D. O.]

† [Sp. nov.? Foliis crasse coriaceis subcomosis.—D. O.]

decanica). Large numbers of these pigeons were killed; and I preserved specimens of the fruits contained in their crops, all of which fruits I failed to find or reach in the growing condition. Amongst the fruits were abundance of wild nutmegs and wild coffee-berries. The various species of *Carpophaga* must play a most important rôle in the distribution of plants, and especially trees, over the wide region inhabited by them*. The crops of the birds are found to contain an astonishing quantity of fruits, some even larger than the nutmeg. Many of the fruits are entirely uninjured and quite fit for germination; and since when wounded, and probably also often when frightened, or by accident, the pigeons readily eject these fruits and constantly eject the hard kernels, these birds must constantly be transporting the seeds of trees from one island to another. As soon as ever a few littoral trees, such as *Barringtonia*, have established themselves by drifted seeds upon a fresh coral island, the pigeons alight in their passages upon these trees and drop the germs of more inland trees. I saw the pigeons thus resting on one of the two or three trees as yet growing on Observatory Island, a very small islet in Nares Bay. At Banda formerly the growth of the nutmegs was confined by the Dutch Government to one island of the group, Great Banda, and the trees on the other islands were destroyed. It was found necessary, however, to send a Commission every year to uproot the young nutmeg-trees sown on the other islands, especially Gunong Api, by the fruit-pigeons. Some of the wild nutmegs in the stomachs of the birds from Pigeon Island were soft and partially digested, and unfit for germination.

The main island immediately opposite Pigeon Island consists of a low swampy flat of coral sandstsne covered with a dense growth of high trees. Immediately at the water's edge, along the sandy beach, are the usual littoral trees with banks of seaweeds thrown up at their roots, whilst a few yards inland a different set of trees, with tall straight trunks, grow, the trees being so closely set that it is very sensibly dark beneath them. Amongst these trees is one with a vermilion-red fruit, which fruit was also found at Aru, and, lying thickly scattered on the mud beneath the tree, is a familiar object at both places, and which was further found on the sea-surface off the north coast of New Guinea amongst the drift-wood from the Ambernoh river. Whilst the ground beneath is bare and muddy and beset with the bare roots of the trees, the trunks of the trees and fallen logs in these dark swampy woods are covered with the most luxuriant growth of feathery mosses and Jungermannias. On one of these tree-trunks I found also a very curious fern, *Trichomanes peltatum*. The fronds of the fern are orbicular in form, and adhere in rows (as connected by the slender rhizome) to the bark. They are pressed absolutely flat against the bark, so as to look like an adhering crust, and have all the appearance of a *Riccia*, or some such form, for which, indeed, I took them when I gathered the specimens by cutting off flakes of the bark. At a few hundred yards inland are tracts covered with young sago-palms with several species of *Zinziberaceæ* and large swamp-ferns growing beneath them, and a *Sphagnum* in small quantities. On a collecting-expedition to this part of the island I crossed the swamp, here about half a mile in width, and came to a steep rise in the land of about 30 feet or so. Here the rock appeared to be volcanic, and the soil, draining itself into the swamp below, was firm and comparatively dry. The vegetation here changed its aspect considerably; and a tree fern, about 6 feet in height, occurred at the verge of the rise, and a *Melastoma*. The rising ground itself was covered with a dense growth of trees, with but little underwood. Beneath these trees grew in abundance isolated tufts of *Trichomanes javanicum*, the erect fern-like *Selaginella inæqualifolia* (so abundant in the Fijis, the Aru islands, and the Moluccas), and a small zingiberaceous herb. I found many trees here which I had not met with in the swampy ground. The trees were covered with climbing Aroids, of only one species of which I was able to obtain fertile specimens. *Asplenium nidus* and several epiphytic ferns of somewhat similar habit were abundant; but I missed the large *Platycerium* so abundant at the Aru islands. The *Trichomanes javanicum* and all the low vegetation here was bound together by a horsehair-like *Rhizomorpha*, which was in such abundance as to be a hindrance in the securing of good specimens of the plants.

---

* Sir Charles Lyell (Principles of Geology, ninth edition, p. 624) refers to the transportation of seeds by the agency of birds, and notes especially the transportation effected by pigeons, quoting Captain Cook's 'Voyages' (book 3. chap. iv.) where it is stated that at Tamra "Mr. Foster shot a pigeon" [obviously a *Carpophaga*] "in whose craw was a wild nutmeg."

Of palms I saw, on the whole, in the Admiralty Islands five species—the cocoa-nut, sago, and *Areca* palms, a *Caryota*, and a small fan-palm. I procured specimens of leaves only of the two latter. The fan-palms appeared identical with one procured in the Aru Islands. I saw no rattans: but they grow in the islands; for in one canoe I saw a rattan stem in use as a cable. A young palm with prickly leaf-stalks, a dried specimen of which is sent, may prove to be of a further species. The cocoa-nut palm is, as has been before mentioned, abundant on the inhabited islands, where young trees are planted by the inhabitants with great care around their villages, each young tree being protected from the numerous pigs or other injury by means of a neat wicker-work cylindrical fence. On the uninhabited islands cocoa-nut palms are occasionally, but not abundantly, present. The natives, however, plant the palms on uninhabited islands; for I found four or five young trees planted on Observatory Island, each carefully girt at its base with a circle of stones. Cocoa-nut palms grow also on the mainland, on the tops of the hill-ridges, mostly in clumps, as if one or a few trees originally established had seeded others around. There can be no doubt that these plants were planted by natives; and most probably the spot occupied by each clump was inhabited at some time. This part of the main island may formerly have been more thickly inhabited than it at present appears to be. I saw no dwarf varieties of the cocoa-nut; the trees are all of the common tall kind. The *Areca* palm is abundant almost everywhere on the main island.

The sago-palm grows, as usual, socially, in swamps; as usual, also, there is a very large preponderance of immature examples which have not yet begun to form a stem. Indeed it was only in one swamp that any stemmed specimens were met with at all. No doubt the natives lose no time in felling all the mature trees in spots easily accessible from the coast, and very often cut them before they are mature, for fear of their falling into other hands. A Cycad is abundant, and grows occasionally to a height of 30 feet, looking like a palm.

The three species of *Pandanus* met with are identical with the three found at the Aru Islands. The two larger ones were common and striking features in the aspect of the coast-vegetation. I saw no bamboos in the islands, and they are not in general use amongst the natives; but I saw a few chunam boxes made of bamboo joints.

Amongst the large forest trees an enormous *Ficus*, with the usual wonderful compound stem, was the most striking. A tree also with the vertical plant-like roots, a familiar phenomenon in

Philippine forests, was common; but, unfortunately, as usual, no specimens from the high trees could be obtained. A few flowers were picked up upon the ground; but it was found impossible to make out to which tree, amongst a number of trunks, a particular blossom spread over the ground belonged. Several araliaceous trees and shrubs were characteristic features of the vegetation. A bright-coloured *Coleus* was amongst the few terrestrial herbs. A *Dracæna*, often beautifully reddened, was common; but no brilliant Crotons were seen. A bright-flowered malvaceous tree (*Thespesia populnea*) was amongst the littoral trees. Possibly this yields fibres for ropes &c. to the natives.

Fungi were abundant on the dead wood in the swamps and woods; and a considerable number of forms were collected, some of which, I think, are of special interest.

Seaweeds were cast up on the shores at every tide in great abundance, and yielded a greater variety of species than had before been met with by me on tropical coral coasts.

Notes on the various Plants made use of as Food and as Implements, Clothing, &c. by the Natives of the Admiralty Islands.

The principal vegetable food of the Admiralty-Island natives, besides cocoa-nuts, is sago, which is roughly prepared and made up into hard masses of a cylindrical form, which were constantly carried by the natives in their canoes. The cylinders are about 1½ foot long and 8 to 10 inches or so in diameter, and are done up in mats for preservation. A specimen of the sago is sent for the Kew Museum.

Besides sago, the natives have a taro (*Caladium esculentum*?), which is cultivated by them, but apparently in no very great quantities. A very similar *Caladium* was found growing wild on the main island. The plant is cultivated in small enclosures round the houses in the villages; but I saw such cultivated taro only in one village on D'Entrecasteau Island; on Wyld Island (the other inhabited island near the anchorage) I saw no traces of such cultivation. The rhizomes are of excellent quality, and were much used on board the ship. No yams or sweet potatoes were seen on the islands. The natives have plantains, but not in abundance. A species of *Artocarpus* grows on the inhabited island, near the houses. The natives eat a wild mango and a small wild fig, also the fertile fronds of a large *Acrostichum* (*A. aureum*?) and a large brown fruit (Anonaceæ?) which was found growing at Aru on a large forest-tree. (Specimens of all these fruits are sent in the collection.)

The natives have also a sugar-cane much larger and finer than that of the Papuans at Humboldt Bay. The ripe canes were 6 feet long and 1¼ inch in diameter. They were heavy; but did not, of course, contain as much sugar as West-Indian canes.

The natives chew betel, using the betel-pepper, Areca-nut, and coral-lime, or chunam, as usual, together. (The natives of the Louisiade use the Areca-nut and chunam only, and have no betel-pepper—Macgillivray, 'Voyage of the 'Rattlesnake,'' vol. i. p. 222.) One or two natives only were observed who did not use betel. Nearly all use it to excess. I did not see the betel-pepper growing, but only saw it in use. The chunam is carried, as at Humboldt Bay, in long gourds perforated at one end to receive the long stick or spoon with which the lime is carried to the mouth. The gourd here in use is different in form from either of the two forms in use at Humboldt Bay. The use of tobacco is unknown to the natives, as is also that of kaava.

The women wear as their only clothes two bunches of a grass, apparently—one in front, the other behind. The men wear occasionally a narrow strip of bark cloth about 5 feet long and 6 or 8 inches in breadth, which is almost white when new and clean. The cloth is in the form of a long natural sac open at both ends, being evidently loosened from the cut limb of the tree from which it is made by beating, and then drawn off entire. This cloth is sometimes reddened by being rubbed with a red earth used by the natives for smearing their bodies. No better native cloth was seen; and the natives apparently do not know the method of fusing the fibrous matter from several pieces of bark together, so as to form taffa like that of Fiji or Tonga. I saw no articles of ornament or clothing here made of a *Rhizomorpha*, as occurs at Fiji and Humboldt Bay.

Very neat armlets and waistbelts, of mixed yellow and black fibres plaited together, are made by the natives; and excellent bags are made of a fine plaited mat-work.

The seeds of *Coix Lachryma* are used as beads, as they are by so many other savages, and are also used as ornaments to the obsidian-headed spears, the native's chief weapon—being lashed round the necks of the spears just below the heads, so as to form four or more longitudinal rows. A dry double ovoid fruit is worn sometimes in the huge slit in the ear as an ornament, the fruit hanging at the junction of the two ovoids. The fruit was not found growing.

For use in their canoes, an excellent strong rope, apparently of some bark-fibre, is made by the natives; also a most perfect small twine, of which large sein-like fishing-nets are made, and also small hand-nets, of which latter a specimen is forwarded. The fine twine is probably made of plantain-fibre. No use appears to be made by the natives of the fibre of the cocoa-nut bush. A hard brown fruit, as big as a goose's egg, is used for cementing the seams of canoes. The fruit is broken open for the purpose, in order to obtain the kernel, which, I think, is applied raw; but in what manner, I did not find out. The fruit is forwarded. The natives do not use bright Crotons or Dracænas for decoration of their persons, as do the Papuans of Humboldt Bay. I saw only one man with green leaves fastened to his shoulders, and one with a flower of *Hibiscus rosa sinensis* stuck in his hair. A leaf is often worn doubled over the cone of hair, which is made to project from the back of the head by tying the usual loose mop of hair round at its base close to the back of the head. The leaf thus worn looks like a sort of bonnet. A *Dracæna* leaf is often used.

About the houses in the villages bright red Dracænas are commonly planted as ornaments, representing the flower-garden in its most primitive stage. I saw no bright *Amaranthus* flowers, though the Humboldt-Bay natives had plenty of them.

Of clearings of land for the cultivation of taro or sugar-cane in quantity, such as are to be seen at the Aru Islands and Fiji, and such as there are probably at Humboldt Bay, no traces were seen.

Supplement to the Enumeration of Fungi of Ceylon. By the Rev. M. J. Berkeley, F.L.S., and C. E. Broome, Esq., F.L.S.

(Read December 16, 1875.)

[Plate II.]

On a revision of the large collections from Ceylon sent by Mr. Thwaites, a few unrecorded species have occurred, and two very curious new genera, of both of which we are enabled to give faithful sketches, though it is very desirable that a larger supply of specimens should be received, especially of *Endocalyx*, which, with the formerly described *Alwisia*, is somewhat anomalous amongst the *Myxogastres*. The early stage of both is quite unknown; and they may possibly form a group with *Lycogala terrestre* between *Myxogastres* and *Trichogastres*. Large as is the number of species which we have described, doubtless many remain to repay future researches; and we still hope that his numerous duties will not entirely draw off our friend from his favourite Cryptogams.

* Polyporus dissitus, *B. & Br.* (*Thwaites*, no. 966.)
Spores angular, ·10001–·00015 long.

1188. Pterula multifida, *Fr.* (No. 19.)
On the ground amongst small herbaceous fragments. Peradeniya.

Artocreas, *B. & Br.*

It is necessary to remark that this is synonymous with *Michenera*, B. & Curtis, and that *Artrocreas*, B. & C., is the same with *Michenera artocreas*, B. & C., Cuban Fungi, no. 413.

*Diderma depressum, *Fr.* (No. 1044.)

1189. Didymium squamulosum, *Fr.* (No. 1039.)
On bark. Peradeniya, Jan. 1869.

*D. microcarpon, *Fr.*, var. *xanthopus*, Ditm. (No. 76.) = *D. farinaceum*, no. 748.

1190. D. reticulatum, *B. & Br.* Adnatum, reticulatum; peridio sulfureo, furfuraceo; floccis pallide citrinis; sporis nigris (no. 1046).
Amongst short moss. Peradeniya, Dec. 1868.

*Physarum nutans, *P.* (No. 1038.)
On thin bark. Peradeniya, Dec. 1868.

1191. P. didermoides, *P.* (No. 135.)
Placed doubfully under *Didymium cinereum*, 756.

1192. P. lividum, *Rostrf.*, var. *conglobatum*, Fr. (No. 55.)
On various decaying substances.

1193. P. Mülleri, *B.* (No. 1043.)
On dead wood, Peradeniya; Crocodile Creek, Queensland.
Looks just like *Trichamphora paradoxa*; but the spores are quite different.

We cannot at present give the characters of this species, as the specimens are at Strasburg.

1194. Dictydium ambiguum, *Schrad.*
On decayed wood. Peradeniya, Jan. 1869.

1195. Stemonitis dictyospora, *Rostaf. Mon.* p. 195. (No. 47.)
On bark. Nov. 1867.

1196. S. scintillans, *B. & Br.* Peridio globoso, subviridi-cupreo; stipite setiformi, aterrimo, nitidissimo; floccis ramosis sporisque globosis fuscis (no. 1042).
On the underside of dead leaves. Peradeniya, Jan. 1869.
Spores ·0003 in diameter.

1197. Ophiotheca Wrightii, *B. & C.*, Cuba, 544 (No. 1047.)
On slender herbaceous petioles. Peradeniya, Dec. 1868.
Spores ·0004 long, granulated.

1198. O. bicolor, *B. & Br.* Peridio globoso, rubro, minute granulato, sporis flavis pulverulentis (no. 350).
On the rind of *Nephelium lappaceum.* Rambootan.
Spores ·0002 long.

1199. Hemiarcyria Karsteni, *Rostaf. Mon.* (No. 49.)
On dead wood. Peradeniya.

1200. Trichia clavata, *P.* (No. 24.)
On bark. Central Province, Dec. 1868.

1201. Perichæna marginata, *B. & Br.* Congesta, pallide cinerea, circumscissa, angulata, intus castanea, margine distincto circumdata; sporis floccisque elasticis flavis. (No. 49.)
On dead wood. Peradeniya.

1202. Licea cinnabarina, *B. & Br.* Applanata, cinnabarina, papillosa, e strato membranaceo hyalino oriunda; sporis subglobosis, lævibus (no. 663).
On bark. South of island, July 1868.
Spores ·0005–·0006 in diameter.

*Alwisia Bombarda, *B. & Br.*

The figure (tab. 2. fig. 6) represents merely the simplest form. A more characteristic figure is given here (Tab. II. fig. 1).

Endocalyx, *B. & Br.*

Peridium calyciforme, pedunculatum, villosum, demum ruptum, e basi crassa oriundum; sporæ subglobosæ echinulatæ.

1203. Endocalyx Thwaitesii, *B. & Br.* Ore insigniter laciniato, laciniis elongatis; stipite gracili, elongato (no. 1048).
On dead sticks. Peradeniya, Jan. 1869.

Spores varying from globose to oval, ·0006–·0008 in diameter. Tab. II. fig. 2. Plant and spores magnified.

1204. E. PSILOSTOMA, *B. & Br.* Ore primum integro, dein fisso; stipite brevi crassiore.
With the last.
Spores ·0008–·001 in diameter.

This curious genus is evidently closely allied to *Alwisia.* The spores, however, are very different and not half the diameter.

1205. ISARIA GLAUCA, *Dittm.* (No. 571.)
Probably a state of some lichen.

ACTINICEPS, *B. & Br.*

Stipes hyalinus, e floccis congestis in capitulum globosum radiantibus, hic in spiculas conicas vitreas granulatas desinentibus, illic in ramulos tenerrimos; sporæ minutissimæ.

1206. ACTINICEPS THWAITESI, *B. & Br.* (No. 1040.)
On dead coriaceous leaves. Peradeniya, Dec. 1868.
Stem ·017 high, head ·0065 in diameter.

The curious spicules are more like parts of a sponge than of a fungus.

Tab. II. fig. 3: *a*, plant magnified; *b*, threads of which the stem is composed; *c*, one of the spicules; *d*, ends of threads with spores.

1207. MYROTHECIUM ATROCARNEUM, *B. & Br.* Disco atro, deplanato, e massa carnea oriundo; sporis ellipticis (no. 167).
Spores ·003 long.

1208. RHINOTRICHUM PALLIDUM, *B. & Br.* Pallide citrinum, effusum, floccis articulatis; articulis spiculiferis, sporiferis; sporis subglobosis v. obovatis (no. 1025).
On dead vegetable matter. Peradeniya, Jan. 1869.
Very pale lemon-coloured; spores ·0007 long, ·0005 wide.

1209. ASCOBOLUS CERVINUS, *B. & Br.* Olivaceus, extus furfuraceus; margine discreto; ascis rectis oblongis; sporis minoribus (no. 422).
On dung. Peradeniya, Feb. 1869.

Allied to *A. æruginеus,* with which it agrees in colour and the distinct margin; the asci, however, are straight and much smaller, as are also the spores, though in the specimens before us they have scarcely arrived at maturity. Spores ·6000 long.

1210. **Sphærostilbe gracilipes**, *Tul.* (No. 27.)
On dead wood.

1211. **Nectria gyrosa**, *B. & Br.* Peritheciis in stroma aurantiacum immersis, oblongis, sursum incrassatis; ostiolo nigro, quandoque elongato; ascis clavatis; sporidiis biserialibus, ellipticis, uniseptatis.

Spores ·0003–·0004 long, ·00015–·0002 wide.

Confounded in the memoir with *Diatrype gyrosa.*

***Dothidea rhytismoides**, *Cd.* (No. 1141.)

Occurrence of Staminal Pistillody in an Acanthad.

By S. Le Marchant Moore, Esq., F.L.S.

[Read June 17, 1875.]

(Plates III. & IV.)

The subject of the present notice is the *Whitfieldia lateritia*, Hook., an example of which has lately been flowering in the Palm-house at Kew.

The normal floral arrangement in this plant is as follows:—The bud is protected by a couple of broadly ovate bracts; these are succeeded by a 5-cleft calyx with oblanceolate segments, inside which is placed the corolla with a tube considerably longer than the calyx, and a half-spreading five-lobed limb exhibiting but slight differentiation into upper and lower lip. Upon the corolla-tube, and at a distance from its base of about a quarter of its length, are seated four stamens in two pairs, one of which has its origin a little higher than the other; each filament bears an anther, consisting of two equal cells with sagittate bases and shallow pollen-cavities; the fifth stamen is entirely wanting; and the whole andrœcium is girt at its base by a fringe of fine hairs. The ovary is very much compressed laterally; it has at its base a deep fleshy annular disk; and its two cells contain each a couple of retinaculum-supported campylotropous ovules. These various points of structure are sufficiently illustrated by the figures 1–6.

The most simple deviation met with is not one exhibiting pistillody. In this case the normally absent fifth stamen is represented by a short staminodic filament alternating with the lobes of the upper lip; it is of an arched form, and about a line in length.

This deviation, doubtless one of reappearance of a selection-lost organ, is associated with a modification of the number of ovules in one of the ovarian cells, which contains three of them; the third, however, is very small, and, though provided with two coats, would probably not have developed into a seed.

The calyx and corolla remain entirely unchanged in all cases exhibiting pistillody, the least-abnormal appearance presented on the occurrence of which is shown at fig. 7, where two of the stamens are seen to have the ordinary form; the third consists of an unequally two-lobed anther hoisted up on a coiled hair-fringed filament about one third as long as its unchanged fellows. The larger of these anther-lobes is usual in shape and amount of pollen produced; the smaller contains but few pollen-grains, and has at its base an ovuloid body seated on a halfmoon-shaped support, evidently representing a retinaculum. The fourth stamen has the filamentary region but very slightly developed; one of the anther-cells is represented by a short spirally twisted band foreshadowing a style, while the other is fairly formed, contains a little pollen at its lower end, and has at its base a small ovule-like papilla on a boss of rudimentary-retinaculate nature; the stamen is hollowed out immediately below the cells, the lower part of the hollow holding four well-developed retinaculum-supported ovules. The last thing to be noted is the rudiment of the fifth stamen; with the exception of the instance mentioned above, this is the only case of the occurrence of such a structure (figs. 8–11).

The next example is very interesting. In this, while two of the stamens are normal in position and structure, the other two are ovuliferous, and have very short filaments inserted on the disk (fig. 12). Fig. 13 shows one of these stamens dissected away: the one cell is usual; the other is separated into two parts, one of which appears as a twisted false-stylar addition to the normal cell, and the other is a small zigzag-outlined body, forming one of the boundaries of the filamentary cavity, which contains at its base two well-developed ovules. Fig. 14 represents the second stamen bears only one ovule, and has an almost full-formed half-cell.

In the next case the abnormality is greater. Here (fig. 15) all the stamens are ovuliferous and seated on the disk. One cell of each anther is normal; the other presents the spiral winding alluded to above (fig. 16). The ovules in all these transformed stamens are two in number, in this respect agreeing with the ordinary ovarian cell. The ovary is very deeply modified; it is a subglobular three-lobed and three-styled organ (fig. 17), the three lobes of unequal size: the least bears a couple of small ovules; the next larger has two ovules of ordinary size (fig. 18), while in the largest of the lobes are seated three stalked ovule-grotesques. The knobbed appendages to the two longer of these stalks are very far from being perfect ovules; but the point of greatest interest relates to the small short-stalked body springing from the sinus of dichotomy of the other two. This, as shown in the figure (19), has a linear slit running the whole length across its anterior face; and appearances were so suspicious, that I carefully examined it for pollen; and though I was not able to detect any, yet I rather incline to the belief that it may be an incipient polliniferous organ.

I was able to examine only one more flower; and this exhibits a modification of form not before observed. In this, stamen No. 1 presents the appearance shown in fig. 16, but with the addition of a third, lowermost ovule about half the size of the others. Stamen No. 2 (fig. 20) is an unstalked pistilloid body with a short curved hairy style, bearing inside its cavity, which communicates with the outer world by means of a longitudinal slit continued to the extremity of the style, three ovules, the uppermost of which is the smallest. No. 3 has the same form as the last; it contains four well-formed ovules. No 4 is to all intents and purposes a carpel, arising, as it does, but a slight distance below the organic apex, and having a long curved style intertwined with the styles of the ovarian carpels. Its carpelloid nature is very emphatically pronounced, inasmuch as it contains not less than five ovules, four of which are full-formed, while the fifth is about half the size of the rest. This organ is joined to the ovary about its centre by a narrow isthmus of tissue, and has a completely impervious cavity.

In all cases where an uncoiled style manifests itself, it is grooved from base to apex, which condition also holds with the styles of the two carpels composing the ovary of this last-mentioned flower, one of whose carpels contains two, and the other three ovules.

I spoke above of a form having four hypogynous transformed stamens and a three-lobed ovary; and I venture to suggest that this third ovarian lobe may be regarded as a reappearance of the normally absent fifth stamen. This suggestion derives strength from the fact that a modified stamen has undoubtedly been found in organic connexion with the ovary; and, on the other hand, if the facts of teratology can be held to have any weight in connexion with the history of descent, such, in this case, is almost *nil*; for one shudders to think of the immense period which must have elapsed since the Personate Adam possessed a three-celled ovary. Of course there remains the third alternative, that it is a structural "leap in the dark"—a freak of development induced by cultivation.

I have looked up all the bibliography bearing on this subject with which I am acquainted, and have met with two cases only in which a normally epipetalous stamen became ovuliferous and hypogynous: Brongniart* has described a Jacob's Ladder in which the corolla is partially aborted, being represented by five small greenish folioles free from each other, while the transformed stamens, inserted beneath the ovary, bear ovules enclosed in an impervious cavity; and Masters† speaks of having seen a drawing by the Rev. G. Smith of a specimen of *Primula acaulis*, in which the stamens were hypogynous and bore ovules in open cavities. Wigand‡ has figured and described a case of *Gentiana amarella* in which there were two ovarially-inserted stamens; but these bore pollen in the ordinary way.

Two roads of investigation remain to be opened out in connexion with this *Whitfieldia*:—one, an attempt at fertilization of the exposed ovules; the other, to determine whether there exists a causal relation between the amounts of polliniferous and ovuliferous production respectively—in other words, whether each transformed organ is strictly limited as to the extent of its exhibition of the sexual elements, or whether cultivation has so profoundly modified it that such is not the case. Should the opportunity occur at a future time, I propose to myself the pleasure of experimenting in this direction.

EXPLANATION OF PLATES III. & IV.

Figs. 1–6. Structure of normal flower of *Whitfieldia lateritia*: fig. 1, natural size; the rest (as all the other figures) more or less magnified. 1. Flower and appendages. 2. The same laid open (the asterisk-marked lobes are those of the upper lip). 3. An anther. 4. Ovary in longitudinal section. 5. The same unopened: *o*, ovary; *d*, disk; *r*, receptacle. 6. Campylotropous ovule on its retinaculum.

---

* Bull. Soc. Bot. t. viii. p. 453.

† Veget. Terat. p. 308.

‡ Flora, 1856, t. viii. fig. 6 p. 715.

Figs. 7–11. Flower with two stamens normal. 10. The ovuloid body on its retinaculum. 11. *o*, papilla at base of anther-cell.
12–14. Transformed parts of the next-described flower.
15–19. Flower with four hypogynous stamens. 19. *p*, the incipient polliniferous (?) organ.
20, 21. The case last mentioned. 21. *a*, the modified stamens, with impervious ovule-bearing cavity.

Enumeration of Plants collected by V. Lovett Cameron, Lieut. R.N., in the region about Lake Tanganyika. By D. Oliver, F.R.S. & L.S., Keeper of the Herbarium, Royal Gardens, Kew.

[Read November 4, 1875.]

[The following notes comprise an enumeration of the species contained in a small parcel of plants received at Kew in February 1875, and which had been collected by Lieut. Cameron south of Kawele (lat. 4° 58′ 3″ S., long. 30° 4′ 30″ E.), in his journey round the shores of Lake Tanganyika in search of the outlet which he discovered in the River Lukuga on the west side. Lieut. Cameron believes this to flow into the Lualaba, which he all but positively identifies with the Congo[†]. The flora of the region round the lake, on this supposition, belongs to the Congo river-basin. The enumeration has been drawn up by Prof. Oliver; the descriptions of new species are by himself and by Messrs. Baker and Spencer Moore, assistants in the herbarium.]

The new species described below are marked *.

Clematis Kirkii, Oliv.
Cleome hirta, Oliv.
Courbonia decumbens, Brongn.
Abutilon ? sp.
Hibiscus cannabinus, L.
Gossypium barbadense, L.
Dombeya spectabilis, Boj. (M. T. M. in Trop. Afr. Flora p. 227).
Waltheria americana, L.
Triumfetta semitriloba, L., or *T. rhomboidea*, Jacq.
Ochna macrocalyx, Oliv.
Vitis, sp. nov. ?
V. serpens, Hochst., var. ? ?
Polycarpæa corymbosa, Lam.
Crotalaria laburnifolia, L.
Pueraria ?

[†] See Proc. R. Geog. Soc. xix. p. 75.

Indigofera (§ *Trichopodæ*) *cuneata*, J. G. B.*

I. (§ *Dissitifloræ*) *dissitiflora*, J. G. B.*

I. hirsuta, L.

I.: an *I. torulosa*, J. G. B.?

I. (§ *Tinctoriæ*) *Cameroni*, J. G. B.*

Phaseolus, sp.

Erythrina tomentosa, R. Br.

Eriosema rhynchosioides, J. G. B.*

Doliochos? sp.

Cassia, sp.

Cæsalpineacea, allied to the "*Kobbo*" of Dr. Schweinfurth, referred by him to *Humboldtia*.

Dichrostachys nutans, Benth.

Rhus insignis, Del., var.? Leafy specimen only.

Kalanchoe platysepala? Welw.

Jussiæa villosa? var.

Cephalandra? sp.

Vernonia obconica, Oliv. & Hiern, ined.

V. pauciflora? Less.

Conyza ægyptiaca, Ait.

Sphæranthus. Perhaps a new species allied to *S. peduncularis*.

Gutenbergia polycephala, Oliv. & Hiern*.

Leptactinia heinsioides, Hiern, sp. nov. ined.

Oldenlandia. Near *O. parviflora*?

Kraussia congesta, Oliv.*

Jasminum auriculatum, var. *β. zanzibarense*? (*I. tettense*, Kl.).

Strychnos? sp. Leafy specimen only (perhaps the same from Batoka country, Dr. Kirk).

Strychnos? sp. Leafy aculeate specimen.

Asclepiadacea (*Raphionacme*?).

Convolvulus (*Breweria malvacea*? Kl.).

Ipomæa. Allied to *I. simplex* and allies.

Convolvulus? sp.

Trichodesma zeylanicum, R. Br.

Heliophytum indicum, DC.

Leonotis nepetæfolia, R. Br.

Ocymum canum, Sims., var.?

Ocymum near *O. obovatum*, E. Mey.

Ocymum, sp.?

Sesamum. Not in a state to describe, with very narrow leaves.

Sesamum. Perhaps the same species. Similar to a specimen collected by Dr. Kirk in S.E. Africa, but not in fruit.

Striga elegans, Benth.?

Rhamphicarpa tubulosa, Benth.

Rhamphicarpa. Perhaps *R. tubulosa*, with oblique rostrate included capsule.

Rhamphicarpa Cameroniana, Oliv.*

Rhamphicarpa? Too imperfect for description.

Cycnium adonense ? E. Mey.
Thunbergia near *T. oblongifolia*, Oliv.
Nelsonia tomentosa, Willd.
Barleria limnogeton, Spencer Moore *.
Hypoëstes, sp. Insufficient for description.
Lantana ? sp.
Lantana near *L. salviæfolia*.
Vitex ? Leaves simple. Not in state to describe.
Vitex. Leaves 3-foliolate; leaflets oblanceolate, obtuse, or broadly pointed, entire, glabrescent, more or less tomentose toward the base of the midrib beneath. Not in flower.
Cyclonema spinescens, Oliv. *
Plumbago zeylanica, L.
P. amplexicaulis, Oliv. *
Arthrosolen glaucescens, Oliv. *
Amarantacea, dub. Perhaps *Achyranthes*. Too decayed to describe.
Euphorbiacea an *Phyllanthus*? sp. Not in flower.
Acalypha, sp. ?
Habenaria ? ?
Lissochilus, sp.
Walleria Mackenzii, Kirk.
Gloriosa virescens, Lindl. The typical plant, and also a form with very broad subopposite leaves.
Asparagus racemosus, Willd.
A. asiaticus, L.
A. Pauli-Gulielmi, Solms.
Anthericum Cameroni, J. G. B. *
Chlorophytum macrophyllum, A. Rich.
Cienkowskia ? sp.
Hæmanthus, sp.
Gladiolus near *G. natalensis ?*
Aneilema longifolia, Hook.
Commelyna, two species.
Nerine, sp.
Fuirena pubescens, Kunth.
Cyperus rotundus, L.
C. coloratus, V.
Setaria glauca, Beauv.
Tricholæna rosea, Nees.
Stipa, sp.
Eragrostis poœoides, Beauv.
E. Chapelieri, Nees.
Eragrostis, sp.
Hymenophyllum polyanthos, Sw.

INDIGOFERA CUNEATA, *Baker*. Suffruticosa, ramulis gracillimis dense pubescentibus, foliis perparvis subsessilibus simplicibus vel ternato-digitatis, foliolis minutis obovato-cuneatis crassis pilosis complicatis, floribus solitariis raro geminis, pedunculis gracillimis folio multo longioribus, calyce minuto dense setoso dentibus linearibus, petalis minutis rubellis, legumine cylindrico glabrescente atro-brunneo, seminibus pluribus.

Belongs to the section Trichopodæ, and closely resembles *I. tri-*

chopoda in the flowers and their arrangement, but differs entirely in the leaves.

Stems very slender, suffruticose, terete, copiously branched, with ascending branchlets densely clothed with fine, variously directed, white, pellucid hairs as long as, or longer than, their diameter. Stipules minute, setaceous. Leaves very minute, nearly sessile, simple and trifoliolate intermixed; leaflets obovate, cuneate in the lower half, usually not more than a line long, complicate, digitate, subacute, clothed with hairs similar to those of the branches, but shorter. Flowers copious, solitary or rarely geminate on a thread-like, nearly naked, ascending peduncle 3–4 lines long. Calyx $\frac{1}{2}$ line deep, densely firmly pilose; teeth deep, linear. Corolla reddish, three times as long as the calyx, externally pilose. Staminal sheath $\frac{1}{8}$ inch long. Pod cylindrical, sessile, $\frac{1}{2}$–$\frac{5}{8}$ inch long, at first obscurely hispid, finally glabrescent, dark brown, straight, many-seeded, not at all torulose.

I. DISSITIFLORA, *Baker*. Suffruticosa, ramulis gracillimis teretibus obscure pilosis, stipulis setaceis, foliis petiolatis pinnatis, foliolis 1–4-jugis lineari-subulatis oppositis pallide viridibus setis paucis adpressis, racemis laxe 3–5-floris pedunculatis, calyce minuto dense griseo-hispido dentibus lanceolatis, petalis parvis purpureis, ovario cylindrico multiovulato.

Belongs to section *Dissitifloræ*, next *I. pentaphylla*, Linn., which it closely resembles in the flowers, but differs entirely in its leaflets and shrubby habit.

Stem erect, suffruticose, with copious, very slender erecto-patent branches clothed only with a few scattered, adpressed, bristly hairs. Stipules minute, setaceous, persistent. Leaves of main stem an inch long, distinctly stalked, with 3–4 distant pairs of opposite, linear-subulate leaflets, which are $\frac{1}{4}$ inch long, grey-green, pointed, narrowed at the base, rather thick in texture, clothed only with a few obscure adpressed hairs like those of the branches. Leaves of branches often with only 3–5 leaflets. Racemes about as long as the leaves, laxly 3–5-flowered, distinctly stalked. Bracts minute, subulate. Pedicels nearly or quite as long as the calyx. Calyx $\frac{1}{2}$ a line deep, densely bristly; teeth lanceolate, as long as the broadly funnel-shaped tube. Corolla purplish, three times as long as the calyx, shortly bristly. Ovary cylindrical, multiovulate. Ripe pod not seen.

I. CAMERONI, *Baker*. Fruticosa, ramulis gracillimis teretibus obscure pilosis, stipulis minutis setaceis, foliis pinnatis breviter petiolatis, foliolis 2–3-jugis oblongis subcoriaceis utrinque tenuiter pilosis, racemis densis brevibus conicis sessilibus folio brevioribus, calyce minuto oblique campanulato argenteo-sericeo dentibus deltoideis, petalis angustis elongatis extus brunneo-sericeis, ovario cylindrico multiovulato.

Belongs to section *Tinctoriæ*, next *I. torulosa*, Baker, from which it differs by its pilose leaves and branchlets, argenteous calyx, &c.

Habit quite shrubby. Branches slender, terete, thinly clothed with minute, adpressed, white hairs. Stipules and stipellæ setaceous. Leaves short-stalked, 1½–2 inches long; leaflets 2–3-jugate, oblong, subcoriaceous, mucronate, ½–¾ inch long, rounded at the base to a short petiolule; side ones opposite; both surfaces, especially the lower, clothed with short minute white hairs. Flowers in dense racemes, an inch long, which are sessile in the axils of the leaves. Bracts lanceolate-navicular, minute, argenteous, caducous. Pedicels very short. Calyx obliquely campanulate, scarcely ½ a line deep, densely argenteo-sericeous; teeth deltoid. Corolla ¼ inch long, densely brown-silky. Ovary cylindrical, multiovulate. Ripe pod not seen.

ERIOSEMA RHYNCHOSIOIDES, *Baker*. Volubilis, dense griseo-pubescens, stipulis parvis lanceolatis persistentibus, foliis longe petiolatis ternato-pinnatifidis subcoriaceis conspicue venulosis, foliolo terminali oblongo distincte petiolulato obtuso minute mucronato, floribus 4–8 in racemum capitatum densum longe pedunculatum dispositis, pedicellis brevissimis, calyce campanulato dentibus magnis lanceolatis, petalis purpureis extus pilosis, legumine oblongo applanato piloso inter semina haud constricto.

Of the Tropical-African species this will have to be placed next *E. parviflorum*, E. Meyer; but it is very different in leaf and calyx, and has entirely the general habit of a *Rhynchosia*—so much so that it would be inevitably referred to that genus if the seeds were not examined.

A voluble herb, with long internodes. Branches densely clothed with short, rather spreading, grey hairs. Stipules small, lanceolate, persistent. Petioles ¾–1 inch long, spreading, densely pilose. Leaflets 3, subcoriaceous, oblong, 1–2 inches long, both sides thinly pilose, the lower with its veins and veinlets raised; the point bluntish, with a minute mucro, the end one largest, distinctly stalked, the side ones shorter and rather oblique. Flowers 4–8, crowded at the top of an axillary peduncle which much exceeds the leaf. Pedicels very short. Calyx 2 lines deep, densely clothed with short, spreading, grey hairs, the lanceolate teeth much exceeding the tube. Corolla twice as long as the calyx, much recurved, densely silky on the outside. Pod oblong, flat, ½ inch long, ¼ inch broad, densely pilose, two-seeded, abruptly rounded at the base, not constricted between the seeds. Flattened funiculus attached obliquely to the extremity of the hilum.

Gutenbergia polycephala, *Oliv. et Hiern, Fl. Trop. Afr.* iii. ined. Herba plus minus incano-tomentella; ramis teretibus striatis; foliis superioribus sessilibus lanceolatis v. ovato-lanceolatis acutiusculis basi obtusis cordatisve amplexicaulibus integris v. subintegris, supra glabratis v. scabriusculis, subtus albido-tomentosis; capitulis parvis numerosis in paniculas cymosas dispositis, squamis involucralibus pauciseriatis, exterioribus lineari-lanceolatis, interioribus 8–12 subæqualibus ovali-oblongis 3-nerviis, achænio obovoideo 10–12-costato glabro v. parce breviter pilosulo.

We have the same from Kilwa (Dr. Kirk).

Kraussia congesta, *Oliv.*, sp. nov. Glabra, foliis ellipticis tenuiter coriaceis breviter obtuse acuminatis basi in petiolum brevissimum angustatis, floribus in cymis brevibus paucifloris axillaribus sessilibus v. subsessilibus congestis, pedicellis bracteolatis brevissimis subnullisve, calycis lobis rotundatis tubo obovoideo æquilongis, corollæ lobis tubo æquilongis fauce hirsuta, antheris apice appendicula gracili terminatis, stylo bifido glabro, ovulis in loculis paucis (circ. 4).

Folia 3–3½ poll. longa.

Rhamphicarpa Cameroniana, *Oliv.*, sp. nov. Herba verisimiliter 1–2-pedalis, caule ramoso tetragono 4-sulcato parce pilosulo v. glabrato, foliis sessilibus v. subsessilibus lineari-lanceolatis linearibusve basin versus sæpe utrinque grosse 1–2-dentatis v. pinnatifido-dentatis, floribus racemosis breviter pedicellatis, pedicello calyce brevioribus, calyce tubuloso-campanulato 10-costato, lobis lanceolatis acutis tubo subæquilongis, corollæ hypocrateriformis tubo (⅘–1 poll. longo) gracili limbo amplo (1½ poll. lato) paulo longiore, labio superiore breviter et obtuse 2-lobato, labio inferiore profunde 3-fido lobis subæqualibus late obovato-rotundatis, filamentis apice piloso-barbatis, capsula calycem paulo superante subtruncata v. obcordata vix aut leviter obliqua, valvis coriaceis retusis.

Remarkable in the retuse fruit, which is neither beaked (except the persisting style-base) nor distinctly oblique.

Barleria limnogeton, *Spencer Moore*, sp. nov. Caule subtereti, leviter tomentoso; foliis petiolatis, oblanceolatis, acutis, integris, primo tomentosis demum supra pubescentibus; floribus spicatis spicis terminalibus; bracteis strobilaceis, inermibus, late ovatis, obtusis, sericeo-tomentosis; bracteolis linearibus, acutis; calycis laciniis exterioribus late lanceolatis, interioribus subulatis; corolla hypocraterimorpha, glabra, tubo quam calyx duplo longiore, segmentis limbi patentis obovatis; staminibus fertilibus 2 exsertis, sterilibus 3; capsula ignota.

Caulis erectus. Folia matura 3–3½ unc. longa; petiolus ½ unc. longus. Bracteæ ½ unc. longæ, nervosæ. Calycis laciniæ pubescentes, exteriores ⅓ unc., interiores ¼ unc. longa. Corolla 1 unc. longa. Ovarium compressum, villosum ; stylus crassus, glabrescens.

A very distinct species of the genus, with the habit of a *Crossandra.* Indications in some of the leaf-axils would lead to the presumption that the inflorescence may be axillary as well as terminal.

Cyclonema spinescens, *Oliv.*, sp. nov. Piloso-pubescens, ramulis teretibus interdum spinis rectis recurvisve supraaxillaribus oppositis folio brevioribus armatis, foliis late ellipticis rotundatisve obtusis v. mucronatis brevissime petiolatis v. subsessilibus, utrinque piloso-pubescentibus, pedunculis 1-floris axillaribus patentibus folio æquilongis v. eod. longioribus supra medium 2-bracteatis, bracteis auguste linearibus, calycis villosi tubo campanulato, limbo 5-lobo, lobis ovato-lanceolatis acutis, corollæ tubo cylindrico calycem superante, limbo 5-partito lobis obovatis integris apice obtuse rotundatis v. late acutatis venuloso-reticulatis, staminibus longe exsertis glabris, ovario glabro.

Folia ⅔–1¼ poll. longa. Bracteæ 3–4 lin. longæ. Flores 1–1¼ poll. diam.

Plumbago amplexicaulis, *Oliv.*, sp. nov. Ramis glabratis v. puberulis, in sicco longitudinaliter sulcatis, foliis obovato-ellipticis late acutatis integris v. undulatis glabris reticulatis subtus nervo medio venisque secundariis prominulis, lamina in petiolum late alatum continua basi conspicue rotundato-auriculata, auriculis amplexicaulibus, floribus cæruleis spicatis, spicis paniculatis glandulosis, bracteis ovatis breviter apiculatis, calyce anguste tubuloso costato puberulo parce glanduloso, corollæ hypocrateriformis tubo gracili poll. longo, limbi lobis obovatis obtusis nervo medio gracillimo excurrente mucronatis, antheris exsertis.

Folia 2–5 poll. longa, 1⅓–3 poll. lata. Calyx ⅓–½ poll. longus.

Arthrosolen glaucescens, *Oliv.*, sp. nov. Glabra, glaucescens, ramulis foliiferis (circ. ½-pedalibus) teretibus lævibus, foliis alternis adscendentibus linearibus planis utrinque leviter angustatis acutiusculis, floribus tetrameris capitatis, capitulis solitariis terminalibus multifloris, foliis involucralibus ovatis acuminatis glabris floribus brevioribus, receptaculo dense hirsuto-piloso, floribus puberulis, tubo perianthii gracili, lobis limbi patentibus ovato-lanceolatis acutis, antheris subsessilibus lineari-oblongis lanceolatisve plus minus apiculatis, squamulis hypogynis nullis.

Folia ⅔–¾ poll. longa, 1–1½ lin. lata. Perianthium tubo ½ poll. longo.

Anthericum (Dilanthes) Cameroni, *Baker.* Caule pedali, foliis caulinis 4 anguste linearibus duris glabris persistentibus, racemo simplici laxifloro rachi insigniter flexuosa, bracteis parvis deltoideis, floribus

semper geminis, pedicellis brevibus prope basin articulatis, perianthii segmentis lanceolatis dorso nervis 5 laxis purpureis vittatis margine angusto albido, staminibus perianthio vix brevioribus, antheris magnis papillosis, ovulis in loculo pluribus crebris.

This comes nearest the common Cape *Anthericum triflorum*, Ait., wrongly placed by Kunth in *Chlorophytum*; but it may easily be known from that and all other species by the nervation of the perianth-segments.

Root not seen. Stem a foot high, with 3–4 leaves, which vary in length from 6 to 15 inches, narrow, linear, firm, persistent, acuminate, 3–4 lines broad, quite glabrous, with a thickened keel, and about 20 close distinct ribs on each side of it, the uppermost one rising from halfway up the stem, and reaching as high as the top of the raceme. Raceme simple, half a foot long, with a slender very flexuose rachis. Bracts minute, deltoid. Flowers laxly placed, all up to the tip in pairs. Pedicels unequal, ascending or spreading, 1–3 lines long, articulated just above the base, and the flowers easily falling away by this articulation. Perianth ¾ inch long; segments lanceolate, 1½–2 lines broad at the middle, rather reflexed when fully expanded, with five distinct purple ribs in the centre, leaving only a narrow white border on each side. Stamens nearly as long as the perianth; anther linear, papillose, as long as the rather flattened filament. Ovary minute, oblong, with a large number of horizontal ovules in each cell. Style ½ inch long, filiform, declinate.

Note on a Collection of North-Celebes Plants made by Mr. RIEDEL of Gorontalo. By Prof. OLIVER, F.R.S. & L.S.

[Read November 4, 1875.]

IN June last Dr. A. B. Meyer, of Dresden, sent to the Kew Herbarium, on behalf of Mr. Riedel of Gorontalo, North Celebes, a collection of dried plants made in that island, with a request that any novelties which it contained might be published. The state of the specimens and the comparatively small number of authentic types of species described from Celebes accessible to us, prevent our drawing up a complete catalogue of the collection; but the chief points of botanical interest which it suggests are independent of these circumstances, and may, considering how little we know of the botany of Celebes, be worth while laying before the Linnean Society, together with descriptions of eight new species which our materials enable us to describe.

The collection includes between 300 and 400 species; 341 we have noted in our MS. enumeration, the rest being too fragmentary. Of these, 161 belong to polypetalous Natural Orders, but there are only 3 Compositæ, 32 Rubiaceæ, 20 Monocotyledons, and but 1 fern (*Lygodium dichotomum*). There are 6 Anonaceæ, 1 Magnoliacea (*Talauma*), 1 *Nepenthes* (*N. celebica*, Hk. f.), 1 *Gnetum*. Dipterocarpeæ are wholly wanting; and there are no Australian types in the collection.

Sterculia comosa, Wall. (only known hitherto from the specimens of Amboyna origin, distributed by Dr. Wallich from the Botanic Garden, Calcutta), a pentamerous *Callicarpa* which may be *C. pentandra*, Roxb. (known to us from Roxburgh's description of Molucca specimens), also a species of the Loganiaceous genus *Couthovia* (only described hitherto from Polynesia and New Caledonia) are included in Mr. Riedel's collection. We have no information as to particular localities or relative frequency of any of the species.

Saurauja longifolia, *Oliv.*, sp. nov.

Ramulis dense et longe setosis setis patentibus decurvisve, foliis angustis elongatis ovali-oblongis tenuiter acuminatis basi angustatis integris utrinque setoso-hispidis, floribus axillaribus fasciculatis cum pedicellis dense setosis, sepalis ovatis acuminatis, petalis glabris sepala longiora vix superantibus, ovario glabro, stylis 4–3 basi breviter coalitis.

Folia 10–15 poll. longa, 1½–1¾ poll. lata; petiolus ¾ poll. longus. Pedicelli 2–4 fasciculati, ⅓–½ poll. longi, calycem æquantes. Flores ¾ poll. lati.

Tarrietia Riedeliana, *Oliv.*, sp. nov.

Foliis 3-foliolatis, foliolis ovali-oblongis utrinque acutatis petiolulatis superne glabris subtus pallidis dense et minute lepidotis, paniculis in axillis foliorum superiorum eisdem vix longioribus furfuraceo-lepidotis, alabastris pedicellatis, calyce (fl. ♂) profunde 5-fido crassiusculo lobis ovato-deltoideis intus tomentellis, columna staminea brevissima antheris arcte globoso-capitatis inclusis.

Foliola 2½–4 poll. longa, 1–1½ poll. lata; petiolus 1½–3 poll. longa. Flores ¼–⅓ poll. diam. Antheræ, ut videtur, 15–20.

Allied to *T. argyrodendron*, Bth., of Australia.

Bauhinia (Phanera) Riedelii, *Baker*, n. sp.

Cirrosum, ramis, pedicellis, calycibus et foliis infra dense ferrugineo-pubescentibus, foliis rigide subcoriaceis 11-nervatis profunde emarginatis basi et apice cordatis, corymbis densis terminalibus, bracteis parvis linearibus caducis, pedicellis ascendentibus tubo calycis æqui-

longis, tubo cylindrico, limbi segmentis discretis lanceolatis quam tubus duplo brevioribus, petalis glabris oblanceolatis, staminibus perfectis tribus, ovario ferrugineo-piloso, stipite et stylo brevibus, stigmate peltato.

Folia 15–24 lin. longa, lobis 12–18 lin. latis. Pedicelli 6–9 lin. longi. Tubus calycis 6–9 lin. longus. Petala 5–6 lin. longa.

Allied to *Phanera elongata*, Miquel, Flor. Ind. Bat. i. 61 (*Bauhinia mollissima*, Wall. Cat. no. 5782), from which it differs by its calyx-segments not more than half as long as the tube, and by its short style and stalk of the pod.

LAGERSTRŒMIA RIEDELIANA, *Oliv.*, sp. nov.

Ramulis teretibus glabratis, foliis breviter petiolatis ellipticis obtusis v. late apiculatis integris glabris, superne (in sicco) pallide viridibus, venulis secundariis prominulis, subtus luride fusco-viridibus, paniculis puberulis terminalibus foliis superantibus, calycis lobis ovatis acutis tubo 6-alato alis continuis vix sinuatis.

Folia 1½–4 poll. longa, 1–1¾ poll. lata; petiolus $\frac{1}{12}$–$\frac{1}{4}$ poll. longus. Alabastra obovoidea cinereo-puberula 4–5 lin. longa. Flores ½ poll. diam. Petala ovato-rhomboidea, denticulata, breviter unguiculata, venulosa. Stamina glabra. Ovarium globosum, 6-loculare; stylus elongatus, glaber, basi incrassatus. Fructus ovoideo-globosus apiculatus calyce 2–3plo longior, ½–⅔ poll. latus.

LORANTHUS STENOPETALUS, *Oliv.*, sp. nov.

Ramulis teretibus gracilibus glabratis, foliis ovali- v. lanceolato-oblongis plus minus acuminatis basi angustatis, floribus subpollicaribus ternis binisve 3–2-bracteatis breviter pedunculatis in racemos axillares sæpius folio breviores dispositis, calycis margine libero sinuato v. irregulariter dentato, petalis 6 angustissimis basi æqualiter coalitis tubo brevi inflato, antheris anguste linearibus acuminatis adnatis.

Folia 4–5 poll. longa, 1–1½ poll. lata; petiolus ¼ poll. vel longior.

LYONSIA ? CELEBICA, *Oliv.*, sp. nov.

Ramis teretibus dense fusco-tomentellis, foliis late ellipticis acutis apiculatisve basi rotundatis utrinque hirtello-pubescentibus, paniculis axillaribus folio brevioribus pedunculatis tomentellis, floribus appresse hirsutis, pedicello calyci subæquilongo, corolla tubulosa rarissime 5-loba faucibus hirsuta, glandulis hypogynis majusculis crassiusculis ovato-oblongis obtusis inferne connatis ovarium fere duplo superantibus.

Rami crassitie pennæ anserinæ, internodiis 3½–6 poll. longis. Folia 4–7 poll. longa, 2½–4 poll. lata, membranacea, nervis primariis lateralibus utrinque 7–9. Paniculæ solitariæ v. geminæ, cum pedunculo 2–4 poll. longæ v. breviores. Calyx 5-partitus, lobis ovatis acutiusculis basi crassiusculis. Corolla ⅓ poll. longa, basi glabrata, lobis æstivatione subvalvatis apice recurvis intus papillosis. Stamina inclusa, filamentis brevibus hirtis, antheris anguste lanceolatis acuminatis basi lobulis brevibus crassiusculis sagittatis. Ovarium glabrum, 2-loculare, ovulis numerosis.

[Nearer *Lyonsia* than any other genus, with the same valvate corolla, deeply 5-lobed disk, &c. But in *Lyonsia* the corolla is more deeply cleft, showing the tips of the anthers. *Lyonsia* is only known from Australia, New Caledonia, and Fiji. The characters do not appear to agree with any other genus.—*Note by Mr. Bentham.*]

CLERODENDRON RIEDELII, *Oliv.*, sp. nov.

Ramulis petiolisque breviter pubescentibus, foliis ½-pedalibus ovato-rotundatis, late acutatis, basi truncatis subcordatisve medio in petiolum breviter et obtuse cuneatim angustatis, integris, scabriuscule hirtellis, floribus in cymas terminales densas hemisphæricas foliis breviores dispositis, bracteis anguste ovalibus quam calyces subbrevioribus, calyce infundibulari parce puberulo 5-fido, lobis acuminatis tubo æquilongis, corolla glabra calycem paullo superante, laciniis limbi subæquilongis quam lobi latioribus obovato-rotundatis.

Folia majora 6–8 poll. longa et lata; petiolus 2–2½ poll. longus. Cyma 2½ poll. lata. Calyx ¾ poll. longus. Corollæ tubus ¾–1 poll. longus.

TACCA PALMATIFIDA, *Baker*, n. sp.

Foliis membranaceis glabris longe petiolatis simplicibus subrotundis palmatifidis, lobis 13–17 lanceolatis acuminatis, centralibus maximis per tertiam vel quartam laminæ partem egredientibus, exterioribus sensim minoribus.

Petioli dense cæspitosi, sesquipedales vel bipedales. Lamina 10–12 poll. longa et lata, venis 13–17 conspicuis ex apice petioli radiantibus. Pedunculus bipedalis, floribus umbellatis. Pedicelli 12–15 lin. longi. Bacca oblonga pollicaris. Involucrum et perianthium non vidi.

A very singular plant, which, it is much to be regretted, we are only in a position to describe so imperfectly, the only specimen being in fully developed berry, and the involucre withered and broken away.

Note on a Sport in *Paritium tricuspe*, G. Don. By G. King, M.B., F.L.S., Superintendent of the Botanical Garden, Calcutta.

[Read December 16, 1875.]

On taking charge of the Botanical Garden at Saharunpore in December 1868, my attention was attracted by a singular abnormality in a tree of *Paritium tricuspe.* I could find no notice of the planting of the tree, nor, indeed, any mention of it, in the records of the garden; but its age was estimated at about twenty-five years. Prior to the occurrence of the accident to be subsequently mentioned, it presented the following appearance. The main trunk (about 16 inches in diameter) ran up to a height of about 10 feet, and there divided into two nearly equal branches. One of these, which I shall call the *main* branch, continuing in the upright direction, ended in a spreading head, the highest tops of which reached about 20 feet above the ground. The other, which may be called the *lateral* branch, after a long downward curve, entered the soil, and, reappearing about 2 feet from its point of entrance, gave rise to a large leafy bush about 12 feet high and several yards in circumference. Whether this lateral drooping branch had first entered the ground spontaneously, or whether it had been made to do so by accident or by layering, I could not find out; neither could I discover how long time had elapsed since the occurrence. I think it unlikely that a layer had ever been made for the purpose of propagation, as the plant grows from cuttings almost as freely as a willow. Every leaf borne by the main branch was of the normal tricuspidate shape from which the species is named. The lateral drooping branch during its course from the main trunk to the ground gave out neither twigs nor leaves; but immediately after emerging from the soil it gave origin to a multitude of strong healthy branches, which formed, as has been said, a separate bush, apparently quite distinct from the parent tree. On this bush every leaf was of a cordato-reniform acuminate shape; and after many long and careful searches I could not find a single leaf approaching the tricuspidate form of the leaves of the parent. The tree and the bush looked, in fact, separate and distinct plants, so different was their foliage; and by all casual observers they were regarded as such.

Some little time after my arrival at Saharunpore, flower-buds appeared on both parent and sport; and I looked with much interest for the opening of the flowers, anxious to know whether there would be any difference in them. Just before they opened I was obliged to leave home on duty; but I enjoined my specimen-collector to dry a number of each. Scarcely, however, had they begun to open, when the parent stem was blown down close by the ground by a storm of wind, the drooping lateral branch being entirely divided about a foot above its entry into the soil. The bush formed by the branch after its emergence, however, remained quite unhurt, showing that where covered by the soil, the branch had formed independent roots. This flowered freely; and specimens are now sent, as well as a flower from the parent, gathered before its fall.

Since the fall of the parent (the stem of which was quite hollow), a large crop of twigs bearing leaves of the normal form has sprung up from the stool; but none of these had offered to flower up to the time I left Seharunpore. Some months after the accident to the main trunk, I was much interested to find a bud appearing on the limb forming the sport, about 2 inches above the point of its emergence from the ground. This bud I carefully protected. It expanded very slowly; but in the course of three months it grew into a twig bearing leaves exactly like those of the parent. But for the unfortunate accident to the parent, I intended to sow seeds of both itself and the sport, in order to see whether the seedlings would turn out true.

Cuttings made from the two forms are perfectly true. There are in Seharunpore Garden numerous plants of both forms which have originated from cuttings either of the parent or its sport. These are of different ages; but in none of them is there the slightest tendency to produce leaves of two forms. They take either entirely after the parent or entirely after the sport. To satisfy myself on the point, I had a number of cuttings taken from the parent and from the sport, and put into pots under my own eye; and of those that struck, all were all quite true to their origin. I also examined a bed of cuttings of the former year without finding on one of them the slightest tendency to dimorphism. So long as the two forms continue to be propagated by cuttings, there appears to be every probability of their remaining distinct. I shall try to settle whether the same result will be obtained by seed.

I make no remark on the flowers of the two forms, but simply send specimens of each.

There is a very striking resemblance indeed between the foliage of this sport of *P. tricuspe* and the normal form of the allied species *P. tiliaceum*, A. Juss. The flowers of the two are also much alike except in the subsidiary matter of colour. Those of *P. tricuspe* are of a bright yellow with a purple eye. On withering, the yellow changes into a dusky purplish brown, which is very nearly the colour of the flower of *P. tiliaceum* from the first.

Two points I have omitted to notice; and these are that the plants of *P. tricuspe* in the Saharunpore Garden which carry leaves of the normal form incline to the habit of trees, whereas those with the abnormal form of leaf (and in this they resemble the original sport) are more bush-like, and so approach in habit all the plants of *P. tiliaceum* in the garden.

Note.—The sport of which an account is given by Dr. King (and specimens illustrating which are placed in the Kew Herbarium) was originally noticed by Mr. Bell, 'Trans. Bot. Soc. Edinburgh,' vol. vii. (1863) p. 565. It is quoted by Mr. Darwin, 'Variation of Plants and Animals under Domestication,' vol. i. p. 377, but (by a clerical error) as *Cistus* instead of *Hibiscus tricuspis*. It may be noted that *H. tricuspis* (*Paritium tricuspe*) is a native of the South-Sea Islands, from which, according to Roxburgh, it was introduced into India. *H. tiliaceus*, on the other hand, is widely distributed throughout the tropics. The facts described by Dr. King point in the direction of *H. tricuspis* being a local form derived from *H. tiliaceus*, to which in the Saharunpore Garden it again reverted. These are facts which appear to show that plants with undivided leaves tend to develop foliage which is more or less divided when they form part of the vegetation of islands. This seems to be probably the case with the island of Rodriguez, according to Mr. Balfour.—W. T. T. D.

Contributions to the Botany of H.M.S. 'Challenger.'

XXXI. On the Polynesian Ferns of the 'Challenger' Expedition.

By J. G. Baker, Esq., F.L.S.

[Read December 2, 1875.]

The following is a complete catalogue of the ferns gathered in Polynesia by Mr. Moseley and the other naturalists in the 'Challenger,' with their stations. The collection contains eleven new species; and the sets from the Admiralty, Aru, and Little Kei Islands are specially interesting, because the Pteridology of these groups offers an entirely untrodden field to the explorer. The arrangement followed and nomenclature adopted in the catalogue is that of the second edition of our 'Synopsis Filicum;' and the numbers prefixed to the new species indicate the place into which they fall in the classification there followed.

Gleichenia dichotoma, *Willd.*
Summit of Ternate.

Cyathea arachnoidea, *Hook.*
Ternate, 2000–4000 feet.

Quite agrees with the two specimens in the Kew Herbarium from Ternate, from which the species was described, which were all we previously possessed.

52*. **Cyathea Moseleyi**, *Baker*, n. sp. Frond ample, pinnate. Rachises brown, those of the pinnæ ciliated on the upperside, naked on the lower. Pinnæ oblong-lanceolate, $1\frac{1}{2}$ foot by 5–6 inches. Pinnules sessile, ligulate-lanceolate, $2\frac{1}{2}$–3 inches long, $\frac{5}{8}$–$\frac{3}{4}$ inch broad, cut down to the rachis into subentire, blunt, slightly curved, tertiary segments 2 lines broad. Texture moderately firm. Upper surface naked; lower with many minute, deltoid, bullate scales on the midrib of the veins. Veins 8–10-jugate, ascending, distinct, all but the uppermost forked. Sori 8–10 to a segment, median, placed a distinct space from both edge and midrib, and with a distinct space between each. Involucre large, membranous, persistent, with a regularly truncate margin.

Admiralty Isles.

Nearest the Fijian and Samoan *C. propinqua*, Mett.

47*. **Alsophila polyphlebia**, *Baker*, n. sp. Height of trunk up to 25 feet. Frond ample, tripinnate. Rachis of pinnæ pale brown, slightly furfuraceous and rough with raised points. Pinnæ oblong-lanceolate, 2 feet long, 7–8 inches broad. Pinnules sessile, lanceolate-ligulate, $3\frac{1}{2}$–4 inches long, an inch broad, cut down to the rachis into close, blunt, distinctly crenated tertiary segments 2 lines broad. Texture thin, but firm. Both surfaces glabrous, the lower with a few minute bullate scales on the midrib of the tertiary segments. Veinlets 12–14-jugate, close, fine, distinct, deeply forked, the lowest sometimes bifurcate. Sori placed close to the costa, and a space from the edge, with a distinct space between each, sometimes 12–15 to a segment, absent from the upper third of the segments.

Island of Wolsau, Aru group.

A fourth tree fern, from the island of Ternate, probably new, is not in fruit; and therefore its genus is uncertain.

63*. **HYMENOPHYLLUM (LEPTOCIONIUM) POLYODON**, *Baker*, n. sp. Rhizome wide-creeping, filiform, lanose. Stipe ¾–2 inches, filiform, flexuose, fibrillose. Lamina lanceolate, tripinnatifid, 2–3 inches long, ½–1 in. broad. Pinnæ 8–12-jugate, rhomboid or lanceolate-rhomboid, parallel with the rachis on the upper side at the base, cuneate-truncate on the lower side, the central ones the largest, ¼ inch broad at the middle, the lower ones reduced. Ultimate segments 10–15 to a pinna, ligulate, close, ½–1 line long, bordered by regular, numerous, minute teeth. Sori one to each pinna, terminal on a side segment of the lowest anterior pinnule. Involucre turbinate, a line deep, the very base immersed in the lamina; valves toothed at the edge, free nearly to the base; receptacle exserted.

Admiralty Islands.

Intermediate between *H. tunbridgense* and *multifidum.*

TRICHOMANES MOTLEYI, *V. D. B.*

Admiralty Islands.

T. PELTATUM, *Baker.*

Admiralty Islands.

Known before only in Samoa and New Caledonia.

T. PYXIDIFERUM, *L.*

Aru Islands.

T. HUMILE, *Forst.*

Ternate and Admiralty Islands.

T. FILICULA, *Kaulf.*

Admiralty Islands.

T. JAVANICUM, *Blume.*

Admiralty Islands.

DAVALLIA HETEROPHYLLA, *Sm.*, var. **NERVOSA**, *Baker*, var. nov.

Differs from the type by its crispate lamina and much more conspicuous veins.

DAVALLIA POLYPODIOIDES, *Brack.*
Ternate, 2000–4000 feet.

D. REPENS, *Desv.*
Aru Islands.
Laciniated form.

D. PULCHELLA, *Hook.*
Ternate, 2000–4000 feet.

D. SOLIDA, *Sw.*, var. LINDLEYI, *Hook.*
Matuku (Fijis).

D. SOLIDA, var. ORNATA, *Wall.*
Aru Islands and Little Kei Island.

D. ELEGANS, *Sw.*
Malanipa Island (Philippines), Ternate, and Admiralty Islands.

D. SPELUNCÆ, *Baker.*
Camiguen Island (Philippines) and Aru Island.

CHEILANTHES TENUIFOLIA, *Sw.*
Banda Islands.

LINDSAYA LOBATA, *Poir.*
Aru Islands and Admiralty Islands.

HYPOLEPIS TENUIFOLIA, *Bernh.*
Tongatabu.

ADIANTUM LUNULATUM, *Burm.*
Banda.

PTERIS LONGIFOLIA, *L.*
Zamboangan (Philippines).

P. INCISA, *Thunb.*, var. AURITA, *Blume.*
Summit of Ternate.

LOMARIA PROCERA, *Spreng.*
Summit of Ternate.

BLECHNUM ORIENTALE, *L.*
Banda Islands.

CERATOPTERIS THALICTROIDES, *Brong.*
Maelan Island, Cebu (Philippines).

ASPLENIUM NIDUS, *L.*
Admiralty Islands, Camiguen (Philippines), Api (New Hebrides), and Matuku (Fijis).

A. NIDUS, var. PACHYPHYLLUM, *Kunze.*
Humboldt Bay, New Guinea, *Prof. Wyville Thomson.*
Closely allied to the Himalayan *A. phyllitidis*, D. Don.

ASPLENIUM OBTUSATUM, *Forst.*
From Cœur Island, Bass's Straits.

A. FALCATUM, *Forst.*
Admiralty Islands, Little Kei Island, Humboldt Bay (New Guinea), Tongatabu.

A. CUNEATUM, *Lam.*
Admiralty Islands and Ternate.

A. LASERPITIIFOLIUM, *Lam.*
Aru Islands.

A. (DIPLAZIUM) BRACKENRIDGEI, *Baker.*
Admiralty Islands.

A. (ANISOGONIUM) ESCULENTUM, *Presl.*
Admiralty Islands, Ternate (2000–4000 feet), Zamboangan (Philippines).

A. (ANISOGONIUM) DECUSSATUM, *Sw.*
Aru Islands.

ASPIDIUM REPANDUM, *Willd.*
Humboldt Bay, New Guinea, *Prof. W. Thomson.*

NEPHRODIUM (EUNEPHRODIUM) MOLLE, *Desv.*
Admiralty Islands and Camiguen (Philippines).

197*. **N. (EUNEPHRODIUM) MICROCHLAMYS**, *Baker*, n. sp. Caudex absent. Stipe ½ foot, pale brown, scaleless, finely pilose. Lamina oblong-lanceolate, 2–3 feet long, 12–15 inches broad, bipinnatifid. Pinnæ, below the small entire top ones, about 40-jugate, sessile, linear-ligulate, the largest 7–8 inches long, ¾–⅞ inch broad, the lowest not reduced, cut down to a broad wing into close, blunt, entire, rather ascending lobes ⅛ inch broad, of which the lowest on the anterior side is rather larger than the rest. Texture membranous. Both sides finely pilose and densely dotted with minute pale-brown glands. Veinlets 12–16-jugate, the lowest pair forming a deltoid arch midway between sinus and costa, the next two pairs meeting at the sinus. Sori round, minute, forming a regular row nearer the costa than the edge of the lobes. Involucre minute, persistent.
Little Kei Island.

General habit of *N. molle*, with very different sori and veining.

N. (EUNEPHRODIUM) PENNIGERUM, *Hook.*
Aru Islands.

N. (EUNEPHRODIUM) INVISUM, *Carruth.*
Tongatabu and Humbolt Bay, New Guinea.

NEPHRODIUM (EUNEPHRODIUM) TRUNCATUM, *Presl.*
Admiralty Islands.

N. (SAGENIA) LATIFOLIUM, *Baker*, var. IRREGULARE (*Brack.*).
Matuku, Fijis.

NEPHROLEPIS ACUTA, *Presl.*
Matuku (Fijis), Camiguen and Zamboangan (Philippines), Banda and Admiralty Islands.

N. ACUTA, var. RUFESCENS, *Presl.*
Tongatabu, Admiralty Islands, and Api (New Hebrides).

N. EXALTATA, *Schott.*
Admiralty Islands.

N. RAMOSA, *Moore.*
Malamaui (Philippines).

POLYPODIUM (DICTYOPTERIS) DIFFORME, *Blume.*
Aru Islands.

P. (EUPOLYPODIUM) DECORUM, *Brack.*
Admiralty Isles.

P. (GONIOPHLEBIUM) VERRUCOSUM, *Wall.*
Ternate, 2000–4000 feet.

P. (NIPHOBOLUS) ADNASCENS, *Sw.*
Matuku (Fijis), Malanipa Island (Philippines), and Admiralty Islands.

278*. P. (NIPHOBOLUS) MACROPODUM, *Baker*, n. sp. Rhizome woody, short-creeping, a line thick, clothed with minute, adpressed, deltoid, black scales with a brown border. Phyllopode 3–4 lines, clothed with scales, just like the rhizome. Proper stipe bordered very nearly to the base. Fronds all alike (barren and fertile), ligulate, very thick and rigid in texture, 4–8 inches long. $\frac{1}{2}$–$\frac{3}{4}$ inch broad, the fertile portion contracted, the point acute, the base narrowed very gradually, the upper surface naked, the lower clothed with thin cottony tomentum like that of *P. adnascens.* Veins entirely hidden. Sori like those of *P. adnascens,* occupying continuously the contracted upper half of the fronds, minute and immersed in the pale-brown tomentum, 6–8 in an erecto-patent row between midrib and edge, and each showing distinctly on the upper side of the frond.
Aru Islands.

Differs from *N. adnascens*, var. *varium*, by its much thicker and more rigid texture, long phyllopode, and almost obsolete stipes.

278*. P. (NIPHOBOLUS) PACHYDERMUM, *Baker*, n. sp. Rhizome wide-creeping, 1 line thick, woody, flexuose, clothed with minute adpressed, lanceolate, black scales with a brown border. Phyllopode very short. Stipes naked, ½–1 inch. Fronds dimorphic: the barren ones oblanceolate-oblong, obtuse, 1–2 inches long, cuneate at the base, ½–¾ inch broad; the fertile ones ligulate, 3–4 inches long. Veins quite immersed. Texture very thick and rigid, the upper surface naked; the lower with only a coating of minute stellate scales, visible under a lens, with a distinct bare space round each. Sori occupying the upper half or two thirds of the fertile fronds, superficial, ½ line broad, 6–8 in an erecto-patent row between midrib and edge.

Little Kei Island.

Nearest typical *N. adnascens*, but much thicker and more rigid in texture, with superficial sori as large as in *Lingua*, and only spaced lepidote scales.

POLYPODIUM (PHYMATODES) IRIOIDES, *Lam.*
Admiralty Islands.

341*. P. (PHYMATODES) MILLISORUM, *Baker*, n. sp. Rhizome not seen. Stipe stout, with a narrow wing extending nearly to the base. Lamina linear-ligulate, 2–2½ feet long, 2–2½ inches broad at the middle, narrowed very gradually to both ends, rigidly coriaceous, quite free from hairs or scales on both surfaces. Veins fine, immersed, the main ones zigzag, ½–¾ inch apart in the centre of the frond, distinct three quarters of the way to the edge; areolæ copious, minute, with abundant free included veinlets. Sori ½ line broad, round, superficial, crowded, filling up the whole of the upper half or two thirds of the frond, distinctly visible on the upper side.

Little Kei Island.

Differs from *P. irioides* by its rigidly coriaceous texture, larger sori, and less distinct veins.

P. (PHYMATODES) LINGUÆFORME, *Mett.*
Admiralty Islands.

Very fine specimens of this rare and little-known species.

322*. P. (PHYMATODES) RAMPANS, *Baker*, n. sp. Rhizome very wide-creeping, ½ line thick, clothed only with a few minute, adpressed, linear, dark-brown scales. Stipes naked, very short. Lamina simple, lanceolate-ligulate, 4–6 inches long, ¾–1¼ inch broad at the middle, acute, narrowed gradually to the ends, membranous, both surfaces quite naked. Main veins erecto-patent two thirds of the way to the edge, then uniting in an arch; areolæ rather large, very distinct, each with an included knobbed free veinlet. Sori not present.

Admiralty Islands.

A next neighbour to *P. lycopodioides*.

Polypodium (Phymatodes) phymatodes, *L.*
Admiralty Islands, Aru Islands, Little Kei Island, Banda, Api (New Hebrides), and Matuku (Fijis).

P. (Phymatodes) nigrescens, *Blume.*
Admiralty Islands.

332*. P. (Pleuridium) phlebiscopum, *Baker*, n. sp. Rhizome woody, flexuose, short-creeping, ⅛ inch thick, clothed with membranous, erect, lanceolate acuminate pale brown scales 2 lines long. Stipe 1–3 inches, rigid, naked, stramineous, grooved down the front. Lamina simple, oblong or ovate-oblong, entire, 1½–3 inches long, 8–15 lines broad at the middle, blunt, or subacute, deltoid at the base, rigidly coriaceous, naked on both surfaces. Main veins erecto-patent, quite distinct to the edge, erecto-patent, ⅛–¼ inch apart; intervening areolæ fine, immersed. Sori superficial, 3-4 in a single row between each erecto-patent vein, round; if single, a line or more broad; often confluent, and then forming an oblong mass 2–3 lines broad.
Summit of Ternate.

Near the New-Caledonian *P. selligueoides* and like small *P. Griffithianum*, but sori in a row between main veins not solitary.

384*. P. (Pleuridium) Moseleyi, *Baker*, n. sp. Rhizome not seen. Stipes 6–9 inch long, stramineous, naked. Lamina quadrangular or rhomboid, simply pinnate, 8–15 inches long, 8–12 inches broad, naked, subcoriaceous. Pinnæ 4–6-jugate, linear-acuminate, all dilatato-adnate at the base, erecto-patent or subpatulous, 4–6 inches long, ½–¾ inches broad, the terminal one like the rest but often larger, the margin horny and irregularly repand, the costa and main ribs glossy and stramineous. Main veins of pinnæ 3–4 lines apart, erecto-patent, very distinct nearly to the edge; areolæ immersed, rather large, with copious, knobbed, free, included venules. Sori round, slightly immersed, under a line broad, one between each main vein nearer the edge than the midrib.
Ternate 2000–4000 feet, and received previously from the same island from *De Vriese* and *Teijsmann.*

Differs from *P. palmatum* by its fewer and more distant main veins and sori, the latter not quite median, and pinnæ all dilatato-adnate at the base.

P. (Drynaria) heracleum, *Kunze.*
Ternate, 2000–4000 feet.

P. (Drynaria) quercifolium, *L.*
Camiguen (Philippines), Aru Islands, Little Kei Island, and Wednesday Island (Torres Straits).

VITTARIA ELONGATA, *Sw.*
Admiralty Islands, Aru Islands, and Malanipa Island (Philippines).

ANTROPHYUM PLANTAGINEUM, *Kaulf.*
Humboldt Bay, New Guinea (*Prof. Thomson*), and Matuku (Fijis).

ACROSTICHUM (STENOCHLÆNA) SCANDENS, *J. Sm.*
Admiralty Isles.

A. (GYMNOPTERIS) REPANDUM, var. QUOYANUM, *Gaud.*
Admiralty Isles.

A. (CHRYSODIUM) AUREUM, *L.*
Tongatabu.

132*. A. (PHOTINOPTERIS) THOMSONI, *Baker*, n. sp. Fronds subsessile, membranous, glabrous, the barren part lanceolate, 2–3 feet long, 6–8 inches broad, cut down to a broad wing into lanceolate or deltoid lobes; those of the centre of the frond 2–3 inches deep, 1½–2 inches broad at the base, erecto-patent, narrowed gradually to an acute point; those near the base more shallow. Pinnæ each with a distinct costa and erecto-patent main veins 3–4 lines apart distinct to the edge, connected by several distinct cross bars as in *Campyloneuron*; the final areolæ quadrate, minute, furnished with copious, knobbed, free, included venules. Fertile portion of the frond extending over the upper half-foot of the rachis, which bears about 20 pairs of subulate lomarioid pinnæ 1½–2 inches long. Rachis brown-stramineous. Both surfaces quite destitute of hairs and scales.
Admiralty Islands.

Of known species, only near *A. drynarioides*, from which it differs by its membranous texture and much smaller size.

PLATYCERIUM GRANDE, *J. Sm.*
Aru Islands.

MARATTIA FRAXINEA, *Sm.*, var. SMITHII, *Mett.*
Ternate, 2000–4000 feet.

LYGODIUM DICHOTOMUM, *Sw.*
Admiralty Islands, Aru Islands, Malanipa, Malamaui, and Camiguen (Philippines).

L. RETICULATUM, *Schk.*
Matuku (Fijis).

OPHIOGLOSSUM PENDULUM, *L.*
Admiralty Islands and Tongatabu.

LYCOPODIUM CERNUUM, *L.*
Admiralty Islands, Banda, Summit of Ternate, and Matuku (Fijis).

SELAGINELLA WALLICHII, *Spreng.*
Humboldt Bay, New Guinea (*Prof. Wyville Thomson*).

S. INÆQUALIFOLIA, *Spreng.*
Aru Islands, Admiralty Islands, Little Kei Island, Camiguen, and Zamboangan (Philippines).

PSILOTUM TRIQUETRUM, *Sw.*
Admiralty Islands.

P. COMPLANATUM, *Sw.*
Admiralty Islands.

XXXII. On some Orchidaceæ collected by Mr. MOSELEY, of the 'Challenger' Expedition, in the Admiralty Islands, Ternate, and Cape York, one of which forms the Type of a new Section of the Genus *Dendrobium*. By Prof. H. G. REICHENBACH. (Communicated by Prof. OLIVER, F.R.S. & L.S.)

[Read January 20, 1876.]

HABENARIA TERNATEA. Racemo plurifloro, bracteis lanceolatis acuminatis ovaria attenuata plus dimidio æquantibus, sepalis triangulis trinerviis, tepalis multo longioribus, bipartitis, partitione superiore lineari setacea breviore, partitione anteriore rachi lineari utrinque pectinata multipartite ambitu late ligulata, labello ad basin tripartito, partitionibus lateralibus elongatis æqualiter capillaceo-decomposito-multipartitis, partitione media breviore lineari setacea, calcari cylindraceo apice clavato ovario breviore, cruribus loculorum antheræ porrectis, cruribus stigmaticis semifalcatis. Caulis validus. Folia lanceolata acuminata, pendentia, in bracteas decrescentia, $3\frac{1}{2}$–6 uncias longa, fere $1\frac{1}{4}$ supra basin inferiorem lata. Flores illis *Habenariæ trichopartitæ*, Lindl., paulo minores, folia multo angustiora. Ab hac specie labello ad basin usque partito ac tepalis longe recedit.
Ternate, 2000–4000′, October 1874.

DENDROBIUM.

Nova sectio *Diplocaulobium*. Rhizomatis repentis gemmæ aliæ pseudobulbos monyphyllos sistentes, aliæ pedunculos basi vaginatos, apice floridos.

D. NITIDISSIMUM. Pseudobulbis fusiformi-teretiusculis, siccis multiangulatis sulcatisque monophyllis, folio lineari-ligulato attenuato bilobulo; pedunculo a pseudobulbo foliato liberrimo ex alia gemma, nitido basi vaginato ancipiti, apice bractea magna chartacea nitida, superaddita bractea minore, fatua visa; flore solitario (semper ?) valde membranaceo, mento bene evoluto, lobulato, sepalis a basali et acuminatis elongatis, tepalis angustioribus, labello sepalorum dimidium excedente a basi lineari extenso, medio trifido, laciniis lateralibus obtusangulis antice lobulatis, lacinia media late ligulate lobulata, carinis geminis a basi versus discum laciniæ mediæ, ibi melius crispato-lobulatis, antice in pilos numerosissimos tomentum densum efficientibus solutis, columnæ androclinio trifido, laciniis membranaceis.

Floris perigonium quasi rostriforme illi *Thrixspermi* cujusdam (*Arachnitis* etc.) comparabile, ¾ pollicis longum delicatissimum, tenuissimum. Plantula valde egregia dignitate gemmarum varia insignis. *Macrolepidi* A. Rich. eo comparabilis, quod rhachis sub bractea incisa quodammodo articulata. Labellum *Macrolepidis* tamen exacte est illud *Bulbophyllosum*.

Admiralty Islands, March 1875.

D. OPHIOGLOSSUM. Pedilonum, caule calamum anserinum crasso, foliis pergameneis oblongo-lanceolatis acutis hinc apice inæqualiter bidentatis, racemo multifloro, foliis ter breviore, bracteis triangulis minutis, sepalo medio oblongo acuto, sepalis lateralibus subæqualibus paulo latioribus, in pseudocalcar cylindraceum amplum apicem versus arcte constrictum extensis, tepalis ligulatis acutis, labello lineari apice triangulo extenso transverse, apicibus obtusatis, columna tridentata, dentibus lateralibus rhomboideis, dente postico triangulo.

Cape York, September 1874.

On *Edgaria*, a new Genus of Cucurbitaceæ.

By C. B. CLARKE, F.L.S.

[Read December 2, 1875.]

EDGARIA.

Dioica. Flores ♂ solitarii et corymbosi. Calycis tubus elongatus, dentibus 5 subulatis. Corolla rotata, profunde 5-partita, segmentis obovatis acutis. Stamina 3 tubo calycis inclusa, filamentis brevissimis liberis: antheræ in capitulum cylindricum arctæ connatæ, una 1-locularis, cæteræ 2-loculares, loculis rectis fusiformibus. Ovarii rudimentum elongatum.—Flores ♀ solitarii, calyce et corolla maris. Staminum rudimenta 0 vel minutissima. Ovarium fusiforme subtrigonum, apice attenuatum, 3-loculare: stylus elongatus, apice trifidus, stigmatibus 3, bifidis, segmentis oblongis stellato-radiantibus: ovula in quoque loculo 2–3, superposita, ab axi pendula. Fructus subexsuccus, elongatus, subrostratus, basi attenuatus, trigonus, 3-locularis, irregulariter sinuato-costatus, intus fibrosus, ab apice ad medium 3-valvis, 6-9-, sæpius 6-spermus. Semina verticalia, elliptica, compressa, rugosa, marginibus obtusis.

Herba annua, scandens. Folia simplicia cordato-ovata acuta. Cirri bifidi. Flores flavi: ♂ longe pedunculati; ex eadem axilla pedunculi normaliter duo exoriuntur, alter 1-florus articulatus mox deciduus, alter serius corymbiflorus: ♀ brevipedunculati; bracteæ bracteolæque omnino nullæ. Flores longitudine 2-unciales. Fructus longitudine 4–6-unciales.

Fig. 1

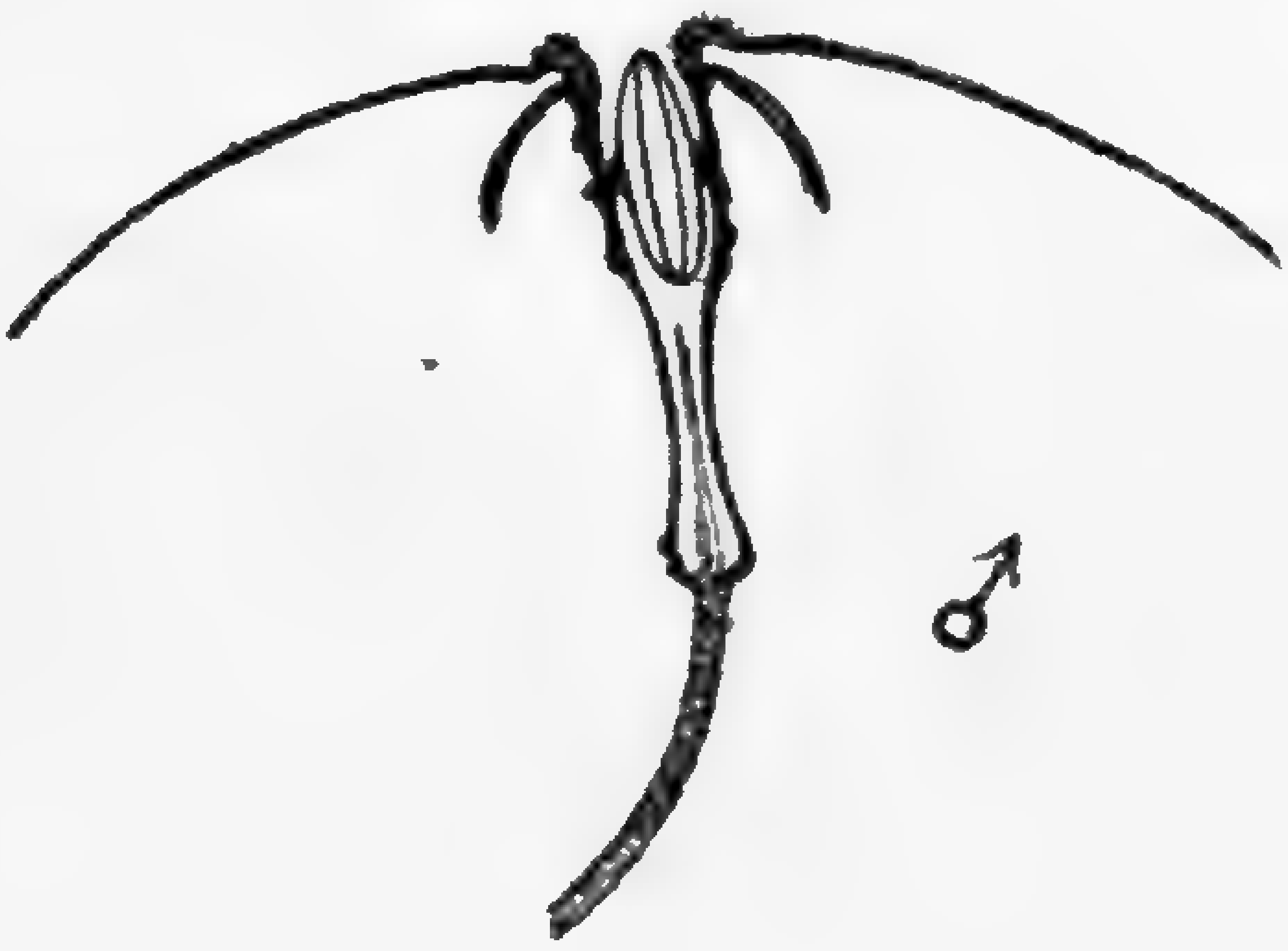


Fig 3.

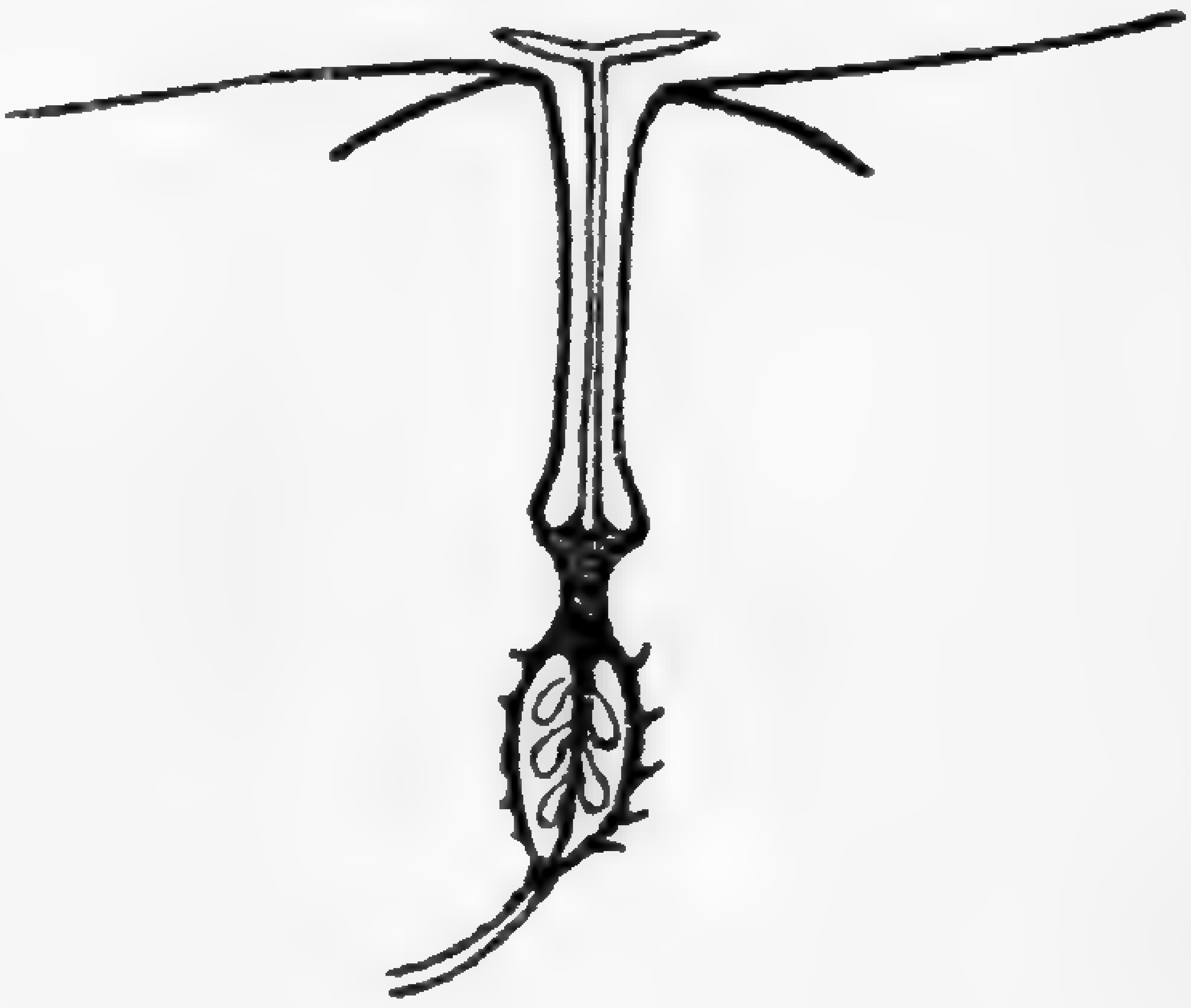


Fig. 2.

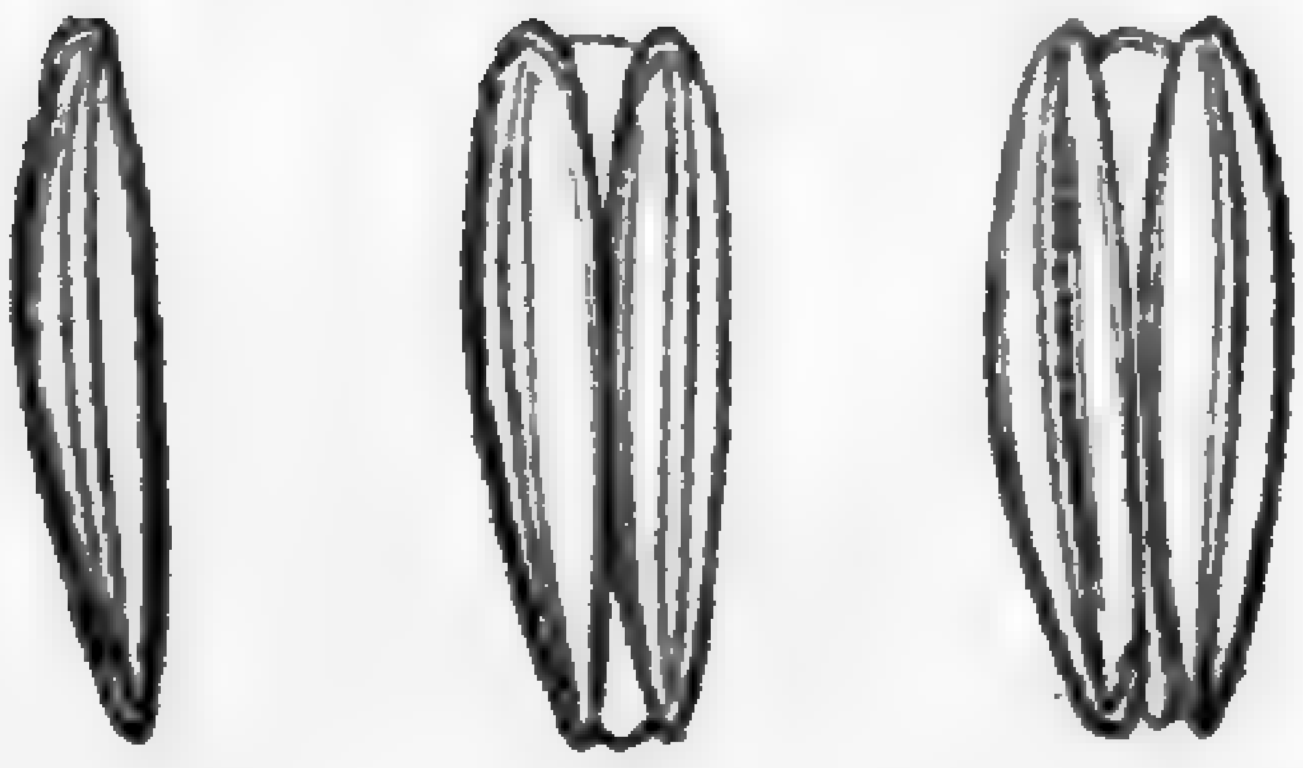
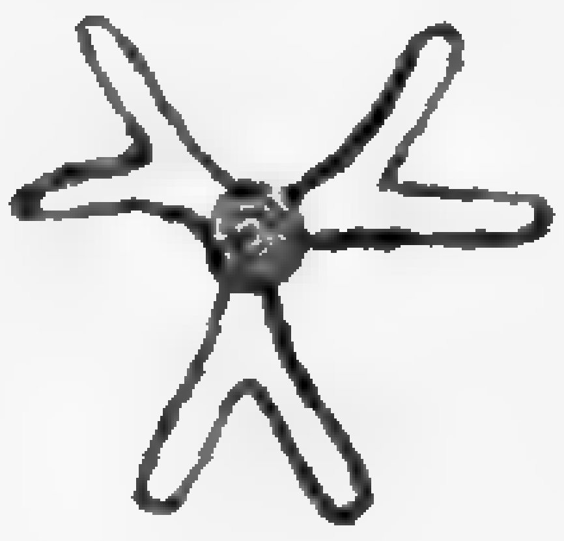


Fig. 4.



Diagrammatic illustrations of the structure of *Edgaria*.

Fig. 1. Vertical section of male flower, of natural size; calyx-teeth linear.
2. Anthers, magnified and cut apart; filaments hardly any.
3. Vertical section of female flower, of natural size.
4. Style, seen from above, to show the three bifid stigmata.

Edgaria darjeelingensis. Caules cum foliis sparsim pilosi. Florum ♂ corymbus glaber. Ovarium junius torulosum, rugosum, pilosum: fructus maturus minus rugosus, pilosus. Seminum testa crassa crustacea subtuberculata marginibus undulatis; endopleura membranacea colore viridi. Cotyledones valde compressæ, orbiculares; radicula supera, *i. e.* hilo proxima.

Hab. Darjeeling in Sikkim, ad 7000–8000 ped. alt.: mensibus Jul.–Sept. florens.

Fig. 5.

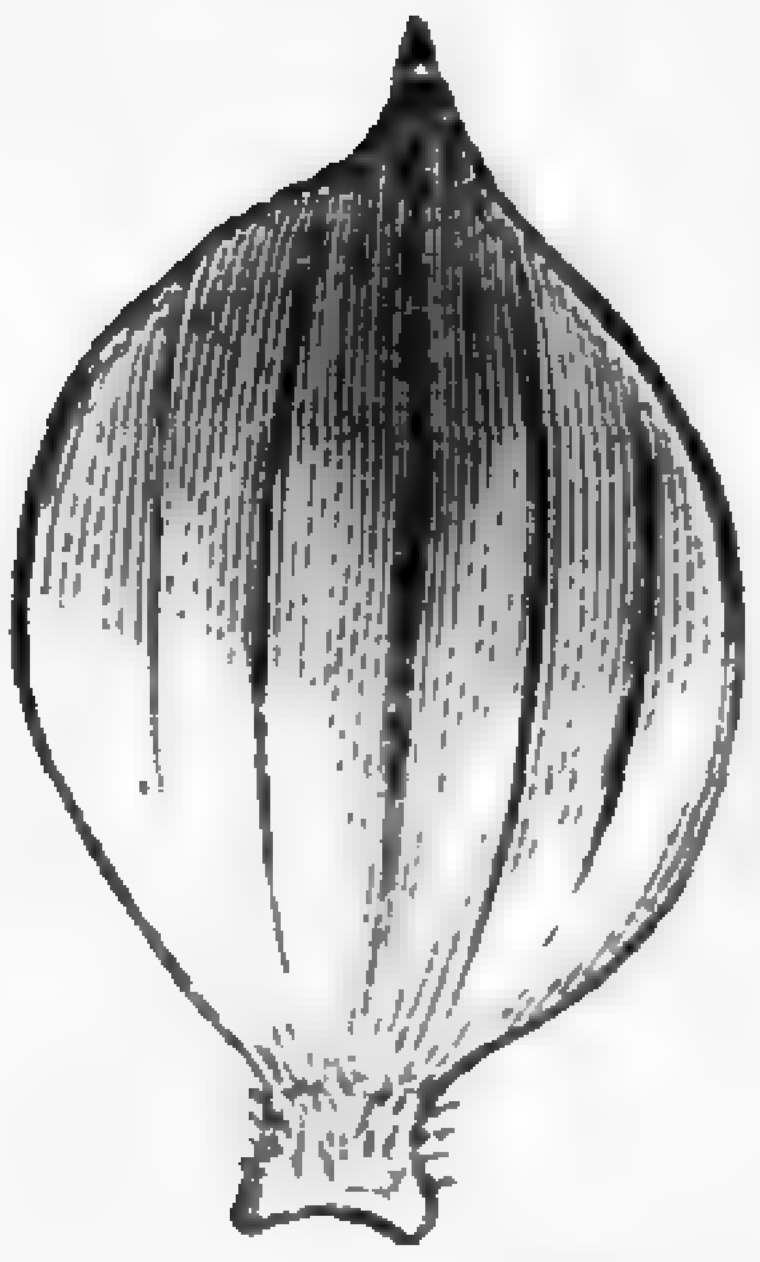


Fig. 6.

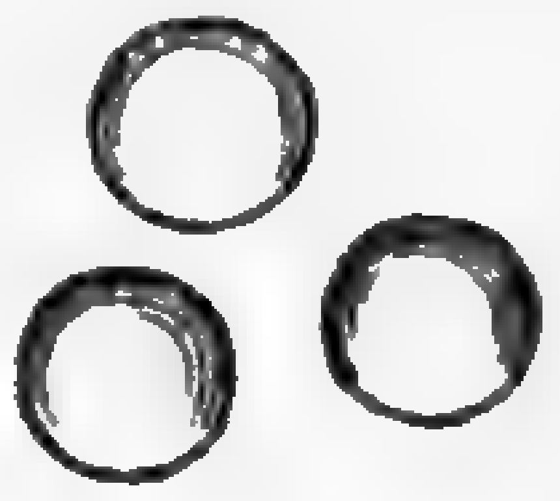


Fig. 7.

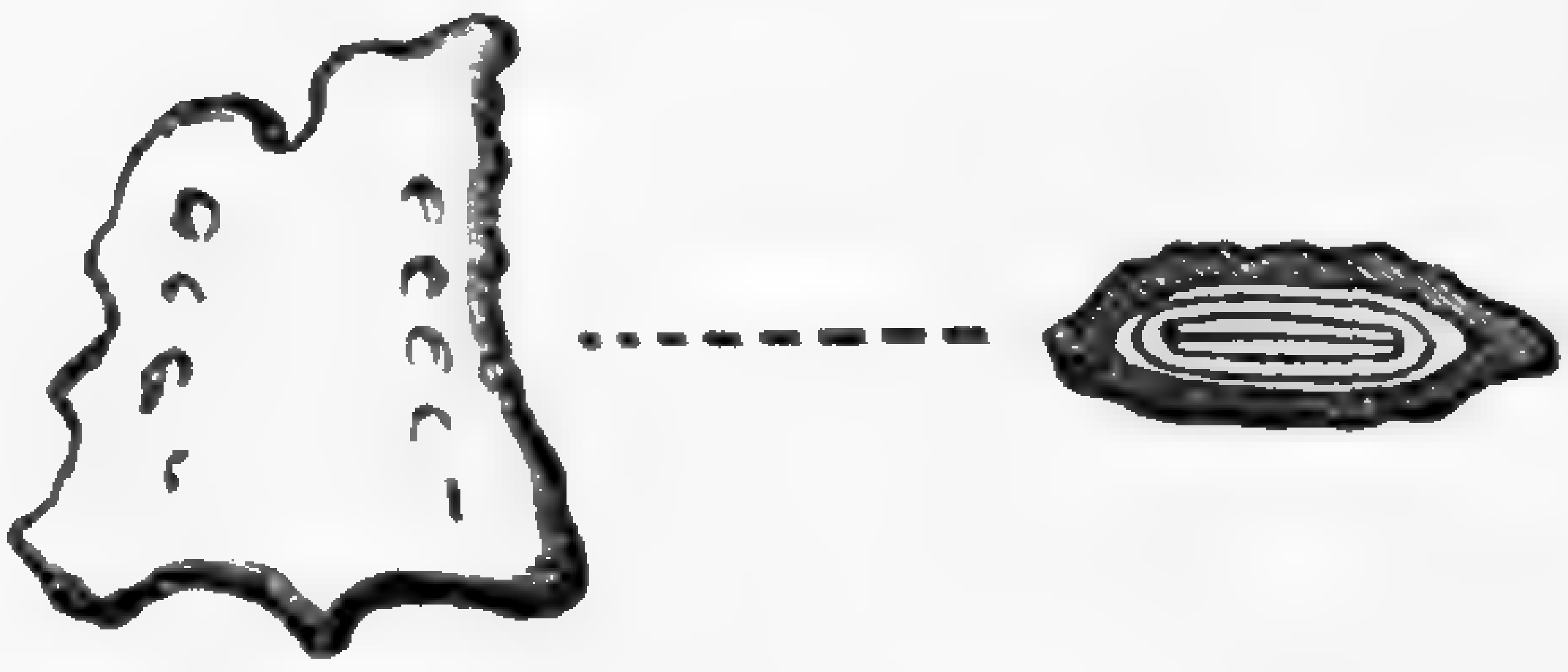


Fig. 8.

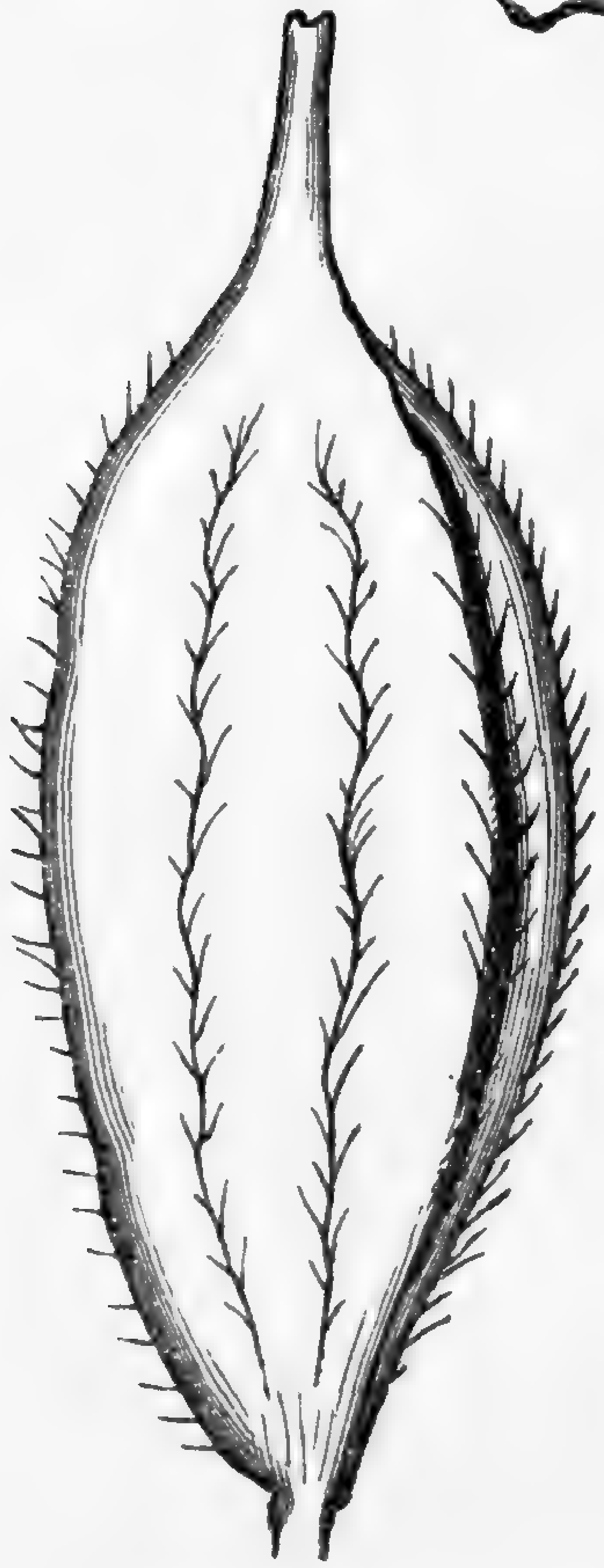
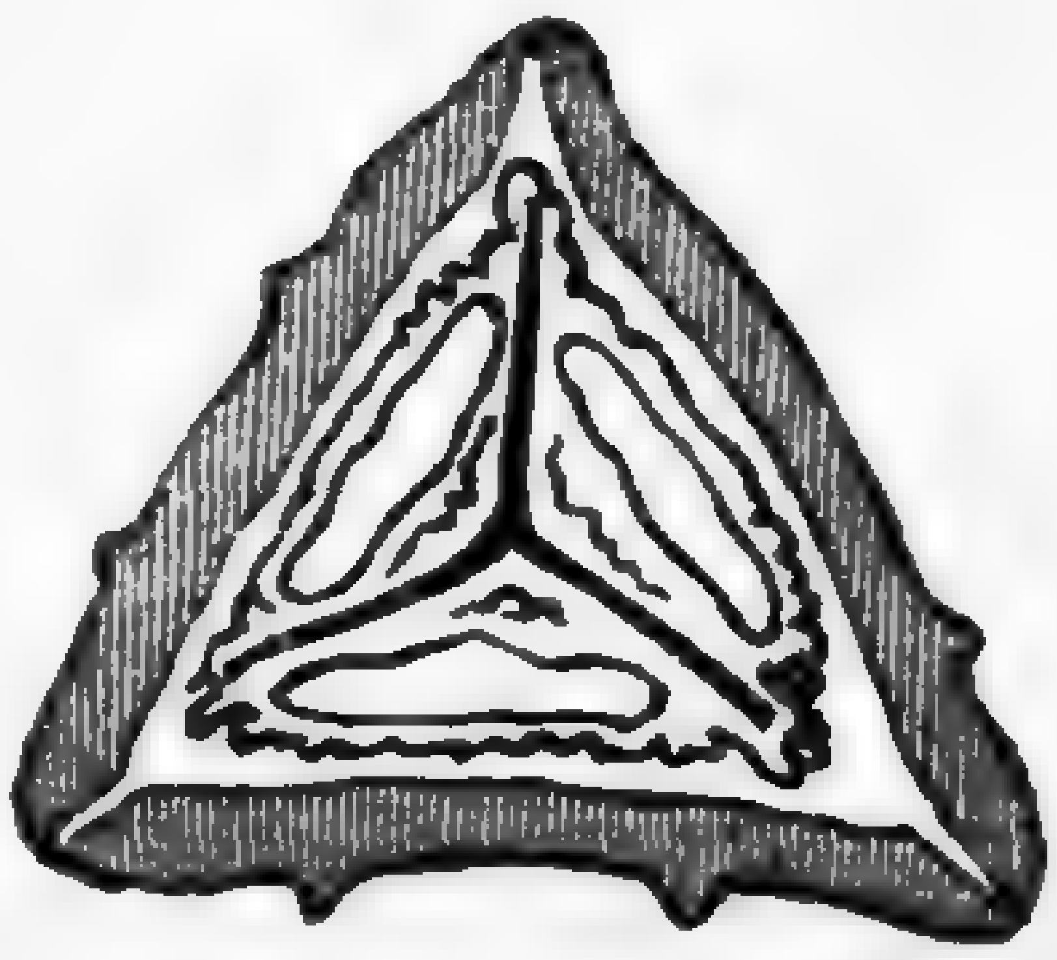


Fig. 9.



5. Petal, natural size; claw furred.
6. Pollen, magnified 80 diameters. Yellow and exactly spherical.
7. Seed, and a horizontal section of the same.
8. A ripe capsule, of natural dimension.
9. A horizontal section of the same. The seeds imbedded in loose dry pith-like pulp. Also of natural size.

Herpetospermum pedunculosum is now abundant about the Station of Darjeeling, as likewise is *Edgaria darjeelingensis*. The two have not hitherto been discriminated, so far as I can discover. In both the general appearance is extremely like, not merely the male and the female flowers, but the fruit; but on examination, the differences are found to be of the first importance. In *Herpetospermum* the anthers are conduplicate, the ovule in each cell solitary, erect; in *Edgaria* the anthers are straight, the ovules in each cell 2–3, pendulous.

Edgaria will be a very difficult plant to intercalate in the series of genera in Bth. & Hook. f. It is nearest in artificial character to the Gynostemmeæ, from which it is very remote in habit. Its remarkable outward resemblance to *Herpetospermum*, even in the fruit, must not be laid too great stress on; for there is now growing on Sinchul Mount, near Darjeeling, mixed with both *Herpetospermum* and *Edgaria*, a third Cucurbit which has female plant and fruit like both; but the seeds are very many, horizontal, and it belongs to a remote part of the order. I add some drawings of *Edgaria*, which are botanic only.

The name is in honour of my friend J. Ware Edgar, C. S. I., the present Deputy Commissioner of Darjeeling.

Botanic Notes from Darjeeling to Tonglo.

By C. B. CLARKE, F.L.S.

[Read December 2, 1875.]

DR. HOOKER, in his admirable 'Himalayan Journals,' says (p. 154 of the first edition):—

"The most interesting trip to be made from Darjeeling is that to the summit of Tonglo, a mountain on the Singaleleh range 10,079 feet high, due west of the station, and twelve miles in a straight line, but fully thirty by the path."

Dr. Hooker made more than one excursion to this mountain. He published a full account of the botanical features in the 'London Journal of Botany' and the 'Horticultural Society's Journal,' which are unfortunately not accessible to me here; and the leading features only are recorded in the 'Himalayan Journals,' whence I quote.

The route which Dr. Hooker took was the old path, which descended to the level of about 3000 feet above the sea, where it crossed the little Runjeet river, and then ascended again to the top of Tonglo at 10,000 feet, this great range of level giving of course a very large variety of species. The present Deputy Commissioner of Darjeeling, J. Ware Edgar, C. S. I., has lately opened a bridle-road which follows the watershed round the head of the little Runjeet river; so that the Lieut.-Governor of Bengal lately rode the twenty-three miles from Tonglo top to Darjeeling in three hours. Mr. Edgar is now building a bungalow on the summit of Tonglo; and when this is completed, the Tonglo excursion will be within the reach of every lady in Darjeeling.

On the 13th of September last I marched in two days to Tonglo top from Darjeeling, camped one day on Tonglo top, and marched back again in two more days. The day I camped on Tonglo there was so violent a rain, with wind and thunder, that I did not leave my tent; and my botanic notulæ relate, therefore, solely to the two days' march thither and two back. The new route lies wholly above 7000 feet, except a very short dip to the saddle at the head of the little Runjeet river; so that it probably affords not more than a third the number of species to be got on Dr. Hooker's route. The present path, after once clearing Darjeeling station, lies entirely in the dripping forest-belt between 7000–8000 feet elevation, with a final ascent to Tonglo of 2000 feet more. The flora of the route thus being uniform, is manageable in quantity, and is a very characteristic one. So dense is the jungle along this path that, except where the natives have cleared a few spots for huts, it is hardly possible to pitch a small tent anywhere.

I determined, immediately on my return to Darjeeling, to jot down, for communication to the Linnean Society, the botanic results of my march out, in the appended list of plants observed—because, while on the one hand these results include three new genera of Cucurbits and various new or improved descriptions of species, on the other hand my own herbarium is tinned down in boxes in Calcutta, and it is not likely that I shall soon be able to work down these rough collections. That is to say, first, I think my Tonglo expedition has supplied me enough new material to justify a paper for the Society's Journal; secondly, I can make the paper as complete now as I shall be able to do at any time before my interest in the expedition has died away and the collection of plants has got mixed in my general collections.

I have made this explanation because the following list of names is given by me almost entirely from memory. I have not got my own set of plants to compare; and I have very few books; it is therefore possible that many errors have crept in. But I believe the names are near enough to give a sufficiently exact idea of the nature of the flora; and, moreover, the Members of your Society will be able to judge from the general character of the list how close its accuracy may probably be.

In order to keep the list within some reasonable limits, I have excluded in general all reference to the distribution of the species named below 7000 feet, and also all reference to other species to be found below 7000 feet. It will be understood that many plants marked "7000–8000 ped. alt., scarce or frequent," may be very common at lower levels. The list is arranged according to the sequence of the orders in Lindley; for I have always kept my plants in that sequence, because Lindley gives me a printed index to the whole, which no unfinished botanic work on orders or genera can do.

The dripping forest in Sikkim extends from about 5500 to 9000 feet. Above 9000 feet the Rhododendrons come in; below 5500 feet is cultivation. The present list represents more particularly the upper half of the dripping moss-covered forest. This forest is specially characterized by the prevalence of Oaks, Magnolias, Laurels, and Araliads, and beneath these trees by Urticeæ, *Impatiens,* Cyrtandraceæ, *Rubi,* and small Bamboos. Conspicuously absent are Leguminosæ and Malvaceæ.

Dr. Hooker has noted the leading botanic features of Tonglo top, and also the gaps or absent orders. But many of the orders stated by him to be conspicuously absent I found very fairly represented, such as Umbelliferæ, Geranieæ, Fumarieæ, Ranunculaceæ. I do not suppose that Dr. Hooker could have overlooked these orders had they been as prominent in May (the month of his visit) as they are now in September. *Epilobium* and *Potentilla,* stated to be absent, are now plentiful.

The list which I have drawn out will be seen at a glance to be somewhat unequal; *i. e.* I have paid much more attention to some orders than to others. The reason Ferns are treated at such length is. that I happen to have by me a kind of elaborate index with notes to my own collection of ferns (tinned down in Calcutta) which has enabled me to name the Tonglo ferns more closely and to speak of varieties more fully than in most other orders.

List of Plants collected between Darjeeling and Tonglo, at 7000 feet or upwards above sea-level.

GRAMINEÆ.

In Darjeeling station (7000 ped. alt.) and on cleared ground to 8000 feet are prominently seen *Eulalia nepalensis*, Trin., *Pollinia*, sp., *Poa subsecunda*, Lam. (=*Eragrostris atropurpurea* auct.), *Muehlenbergia sylvatica*, Torrey, *Agrostis vulgaris*, With., *A. alba*, Schrad. The last two *may* be introduced, as also *Holcus lanatus*, L., *Dactylis glomerata*, L., *Poa annua*, L., which are common. in the station.

In the woods at 7000–9000 ped. alt. are *Isachne miliacea*, Roth., *Digitaria*, sp., *Oplismenus compositus*, Rœm. et Sch., *Centotheca lappacea*, Desv.

At 9000 ped. alt. *Avena Junghuhnii*, Büse; and thence to 10,000 ped. alt. *Agrostis nervosa*, Nees (which hardly differs from *A. alba*, Schrad.). And on the summit of Tonglo, at 10,000 feet, occur *Avena alpestris*, Host., *Calamagrostris ciliata*, Nees, *Bromus confinis*, Nees, *Stipa orthoraphium*, Steud., *Glyceria tonglensis*, nov. sp.

The small bamboo referred to by Dr. Hooker under the native name *Praong* abounds, covering large spaces. But other grasses, from 7000–10,000 ped. alt. on these Sikkim forest-ridges, are rather rare. There are many grasses at 0–2000 ped. alt.; and, again, several alpine grasses come in at 12,000 ped. alt. and upwards.

GLYCERIA TONGLENSIS, nov. sp. Glabra, 4-pedalis. Panicula diffusa, ramis verticillatis inæqualibus, fructu arcte deflexis. Spiculæ 4–8-floræ. Glumæ omnino argenteo-scariosæ. Palea inferior valide 5-nervis, margine argenteo-scariosa.

Species *Glyceriæ* (*Atropidi*) *distanti*, Mert., Koch, proxima. Differt glumis argenteis; palea inferiore valide 5-nervi.

CYPERACEÆ.

Cyperus, which so abounds at lower levels, is hardly seen in the forest from 7000 to 10,000 feet—except in the clearings, *C. vulgaris*, Sieb.; and I collected at this level no other genus in the order except *Carex*. *Carex indica*, L., is plentiful from Darjeeling station to Tonglo top. I gathered *C. fusiformis*, Nees, at 9000 feet, and *C. foliosa*, Don, on Tonglo top at 10,000 feet. Cyperaceæ are certainly rare in the forest at 7000–10,000 feet.

PALMÆ.

No Palm occurs so high in Sikkim; but *Plectocomia* may be seen just above 9000 ped. alt. in Darjeeling.

ARACEÆ.

Numerous in individuals, but mostly out of flower at this season (Sept.). Of *Ariscema*, I noticed *A. erubescens*, Schott, *A. tortuosum*, Schott, *A. costatum*, Martius, and another species. *Scindapsus* (? *Peepla*, Schott) abundant.

AMARYLLIDACEÆ.

The small yellow *Hypoxis* occurs in open places from 7000–8000 ped. alt.

IRIDACEÆ.

An *Iris* (? *decora*, Wallich) was in fruit in the swamps at the very top of Tonglo, 10,000 ped. alt.

ZINZIBERACEÆ.

Gingers, so abundant in Sikkim up to 7000 feet, are few above that level. *Roscoëa lutea*, Wight, however, abounds on the Tonglo ridge (as elsewhere) up to 9000 feet.

ORCHIDEÆ.

Are scarce at 7000–10,000 feet, and now (Sept.) mostly out of flower.

ANTHOGONIUM GRACILE, *Wallich*, and **MICROSTYLIS WALLICHI**, *Lindl.* 7500 ped. alt.

ACERAS ANGUSTIFOLIA, *Lindl.* 7000–8000 ped. alt.
Abundant.

SPIRANTHES AUSTRALIS, *Lindl.* 7000–8000 ped. alt.

HABENARIA PECTINATA, *Don.* 7300 ped. alt.

CYRTOSIA LINDLEYANA, *Bth. & Hook.* 7000 ped. alt.
Just past flower.

HERMINIUM (? **CONGESTUM**, *Lindl.*). 8000–10000 ped. alt.

SACCOLABIUM. 8000 ped. alt.
A small species.

CŒLOGYNE PRÆCOX, *Lindl.* (i. e. *Cœlogyne Wallichii* in Hooker's 'Sikkim'). 8000–10,000 ped. alt.
Frequent.

SATYRIUM NEPALENSE, *Don.* On Tonglo top, 10,000 ped. alt.
And also there a *Habenaria* with non-fimbriated lip.

There are in Sikkim, at 7000–10,000 ped. alt., many fine Orchids to be seen in September; but the above list comprises all that I actually saw in flower, walking on the ridge to Tonglo. Near Darjeeling every showy orchid is stripped from the trees for sale for a few pence in the station.

COMMELYNACEÆ.

Commelyna obliqua, Don (δ *Mathewii,* C. B. Clarke), and *Cyanotis barbata,* Kunth, are common on cleared ground from 7000–8000 ped. alt. *Commelyna cœlestis* (= *C. erecta,* L., ex Asa Gray), cultivated here for its beauty, has established itself as a weed at 7500–8000 ped. alt. *Aclisia*? *Thomsoni,* C. B. Clarke (supposed by Haskarl to be a *Dichæspermum*), is abundant at 8000 ped. alt. It is described in my monograph from imperfect material. It is neither an *Aclisia* nor a *Dichæspermum,* and may be a new genus next *Anilema.* I give a description of the species here.

ANILEMA? THOMSONI, *i. e.* Aclisia? THOMSONI, *C. B. Clarke.* Stamina omnino *Commelynæ, i. e.* tria altero latere floris imposita abortiva brevia, tria altero latere floris imposita pollenifera quorum medium majus difforme. Ovarium elongatum subæqualiter triloculare, in quoque loculo 5–6-ovulatum. Capsula angusta, apice acuminata, 15-sperma, seminibus in quoque loculo uniseriatis.

Not only are the stamens unlike those of *Anilema,* but the capsule is elongate, tapering upwards, quite unlike the capsule of any *Anilema* known to me.

JUNCACEÆ.

Juncus bufonius, L., extends from Darjeeling to 8000 ped. alt. in cleared places. *Juncus castaneus,* Smith, and *J. concinnus,* Don, are on Tonglo top at 10,000 ped. alt.

LILIACEÆ.

CHLOOPSIS CAULESCENS, *Bl.* (= Ophiopogon spicatus, *Auct.*), abounds from 7000–9000 ped. alt.

FLÜGGEA INTERMEDIA? *Schott,* occurs from 7000–8000 ped. alt.

POLYGONATUM SIBIRICUM is on Tonglo top at 10,000 ped. alt.

There is another plant at 8000 ped. alt. like a *Polygonatum*; but the berries have 6–8 seeds in each cell; leaves alternate, short, petiolate, ovate-lanceolate, very acute, striate; peduncles axillary, cymosely 2–7-flowered; berries large, pendulous.

SMILACINA PURPUREA, *Wallich*, is frequent from 7000–10,000 ped. alt.

At 8000 ped. alt. I collected a very large *Smilacina* in fruit, of which the following is the description.

SMILACINA, sp. Caulis simplex 8-pedalis superne hirtellus. Folia petiolata cordato-ovata valde acuminata venoso-striata glabra. Panicula terminalis pubescens composita 8–12-pollicaris, ramis numerosis elongatis 10–25-floris: pedicellis undique divaricatis semipollicaribus.

PARIS POLYPHYLLA, *Don*, is frequent at 7000–10,000 ped. alt.

There is one large *Smilax* at 9000 ped. alt., and a dwarf *Smilax* (barely a foot high) from 9000–10,000 ped. alt.

Dioscorea, so abundant in species and individuals at low levels in Sikkim, I did not observe above 7000 feet.

BALANOPHOREÆ.

BALANOPHORA DIOICA, *Wallich*, is frequent at 7000–9000 ped. alt.

CONIFERÆ.

"The rarity of pines is perhaps the most curious feature in the botany of Tonglo and on the outer ranges of Sikkim; for between the level of 2500 feet (the upper limit of *Pinus longifolia*, Roxb.) and 10,000 feet (that of *Taxus baccata*, L.) there is no Coniferous tree whatever in southern Sikkim."

So Dr. Hooker, correctly. That is, after leaving Darjeeling station (where *Cryptomeria japonica*, Don, *Pinus Webbiana*, and other Conifers are cultivated), no Pine whatever is seen to Tonglo top except a very few yews below the top. Immediately above 10,000 feet in Sikkim the pines come in again in force. And below 2500 feet there is not only *P. longifolia*, Roxb., but *Podocarpus neriifolia*, Don, *P. macrophylla*, Don, and *Gnetum scandens*, Roxb.

A still more curious fact is that, though *Pinus longifolia*, Roxb., in Sikkim does not ascend above 2500 feet (I have never seen it quite so high), yet in the much colder north-west Himalaya the self-same species ascends to 6000 feet.

URTICACEÆ.

The nettles are in tremendous force in the Sikkim wet jungle at 7000–10,000 ped. alt. Though the species are rather more numerous at lower levels, the individuals cannot be.

URTICA PARVIFLORA, *Roxb.*

Very common, especially near huts.

LAPORTEA EVITTATA, *Wedd.*

Abundant, especially where the small bamboo has been destroyed by burning.

GIRARDINIA HETEROPHYLLA, *Decne.*

Abundant.

PILEA SMILACIFOLIA, *Wedd.*

Very common.

P. ANISOPHYLLA, *Wedd.* 8000–9000 ped. alt.

Common.

P. TERNIFOLIA, *Wedd.*

On trees; very plentiful.

P. APPROXIMATA, nov. sp.—P. ternifolia, *Wedd.*, var. β (*Hook. f. et Th. in Herb.*). Pusilla glabra erecta 2–8-pollicaris simplex basi bulbosa, infra subaphylla, foliis omnibus versus apicem caulis præcipue approximatis lanceolatis acuminatis trinerviis laxe profundeque serratis. Flores dioici (an semper) ad apices pedunculorum quam petioli multo longiorum in capitula parva subglobosa densa congesti Stipulæ minutæ. Folia supra minute punctata subtus cystolithis conspicuis destituta.

Species in Sikkim ad 8000–10,000 ped. alt. sat communis: in terra inter muscos (neque in arboribus ut *Pilea ternifolia*) crescit.

P. OXYODON, *Wedd.* 7000–10,000 ped. alt.

Common.

P. SCRIPTA, *Wedd.* Ad 7000–10,000 ped. alt.

Common.

P. UMBROSA, *Wedd.* Ad 7000–9000 ped. alt.

Common.

P. BRACTEOSA, *Wedd.* Ad 7000–8000 ped. alt.

P. SYMMERIA, *Wedd.* Ad 7000–8000 ped.

LECANTHUS PEDUNCULARIS, *Wedd.* 7000–9000 ped. alt.

Common. There is a dwarf form of this, the whole plant often not 2 inches high.

ELATOSTEMA MARIANNÆ, nov. sp. Monoica pilosa. Caulis 3–4-pedalis parum divisus ramis longis simplicibus infra nudus, superne foliis alternis subsessilibus. Folia, omnino elatostematis, inæquilatera, late lanceolata, valde acuminata, altius serrata. Pedunculi masculi e nuda parte inferiore caulis orti 6–15-pollicares apice receptaculo maximo plano crasso quadrato carnoso coronati. Corolla mascula semi-5-fida alba. Capitula fœminea (omnino *Elatostematis sessilis*) in axillis foliorum superiorum sessilia. Stipulæ elongato-lanceolatæ.

Darjeeling, ad 7000–8000 ped. alt.

Forsan novum genus. Receptaculum masculum *Lecanthi,* sed majus.

E. SESSILE, *Forst.* Ad 7000–9000 ped. alt.

Universal.

E. NIGRESCENS? *Miq.* Ad 7000–8000 ped. alt. frequens.

The specific name is given from description only.

E. SIKKIMENSE, nov. sp. Glabrum, ramis apice teretibus ferrugineo-puberulis. Folia alterna elliptica falcata basi angustata apice acuminata fere a basi grosse serrata supra cystolithis inspersa subtus iis destituta. Nervus basilaris inferioris limbi usque ad basin acuminis productus. Stipulæ duæ ad basin cujusque folii, lanceolatæ 5–10 lineas longæ, deciduæ. Capitula dioica aut monoica. Receptacula fœminea (inferiora aut cum masculis intermixta) omnia longe pedunculata late evoluta, bracteis involucrantibus elongatis. Bracteolæ circa flores ovatæ minute pilosæ. In rupibus madidis in Sikkim ad 7000–8000 ped alt. frequens.

Species capitulis fœmineis longe pedunculatis videtur ab omnibus bene distincta.

E. HOOKERIANUM, *Wedd.* Ad 7000–8000 ped. alt.

E. SUBINCISUM, *Wedd.* Ad 7000–8000 ped. alt.

E. DISSECTUM, *Wedd.* Ad 7000–8000 ped. alt.

E. OBTUSUM, *Wedd.* Ad 8000–10,000 ped. alt.

E. DIVERSIFOLIUM, *Wedd.* 7000–10,000 ped. alt., vulgaris.

BŒHMERIA SCABRELLA, *Gaud.* Ad 7000 ped. alt. Fruticosa. Folia ovata acuta mediocriter ac subæqualiter serrata supra sparsim scabra subtus plus minus pilosa. Racemi subsimplices sæpius fasciculati.

B. CUSPIDATA (*i. e.* rotundifolia, *Ham.*). Ad 7000 ped. alt. frequens.

Frutex magna vel arbor. Folia rotunda cuspidata altius falcato-serrata utrinque molliter villosa. Racemi subsimplicices, haud fasciculati fructu penduli.

B. POLYSTACHYA, *Wedd.* Ad 7000 ped. alt. Fruticosa. Folia ovato-elliptica acuta aut acuminata regulariter ac leviter serrata supra minutissime pilosa vel glabrata subtus fere glabra sæpe albescens, conspicue trinervia. Racemi fructiferi densi ramosi paniculati. Folia opposita: interdum omnia alterna sparsa!!

These three *Bœhmeriæ* (together with the low-level *B. Hamiltoniana,* Wedd., which is not seen above 7000 ped. alt.) are all reckoned by Weddell as varieties of his *B. platyphylla.* They appear to me very distinct; and I see in India no intermediate forms whatever.

POUZOLZIA INDICA, *Gaud.* 7000–8000 ped. alt.
Common.

CHAMABAINIA SQUAMIGERA, *Wedd.* 7000–8000 ped. alt.
Abundant.

MEMORIALIS HIRTA, *Wedd.* (inclusa *M. quinquenervi,* Ham.). 7000–8000 ped. alt.
Common.

I collected no fig. Dr. Hooker states that *one* species ascends to 9000 feet on the outer ridges of Sikkim.

EUPHORBIACEÆ.

Of this large order so abundant at lower levels, I only noticed one tree above 7000 ped. alt., ascending to 9000 ped. alt., viz. *Mallotus oreophilus*, Müll., Arg.

At these high levels I do not recollect that I have ever collected Euphorbiaceæ. *Sarcococca pruniformis*, Lindl., I have seen elsewhere at 7000 ped. alt.

Callitriche is in the pools at 7000–9000 ped. alt. Frequent.

QUERNALES.

Quercus lamellosa, Smith, is common in Darjeeling and up to 8000 feet. *Q. annulata*?, referred to by Dr. Hooker at p. 165, I did not collect.

Castonopsis tribuloides, Alph. DC., is common in Darjeeling at 7000–7500 ped. alt., but does not extend much further up on the ridge. *Quercus Andersoni* (nov. sp., Hook. f., as Dr. King tells me) has leaves so exceedingly like the *Castanopsis,* that the natives reckon it the same tree, and the greater part of the "Chestnut" supplied for years past from the Tonglo ridge for building-purposes to the station turns out to be from this undescribed oak. This oak was noticed last year by Dr. King and

Mr. Gamble of the Forest Department; at the Calcutta Botanic Garden it was found among Dr. Anderson's collections, and sent by Dr. King to Dr. Hooker, who, Dr. King tells me, has named it *Q. Andersoni.* The scales form a large, thick, obovate cover to the acorn, nearly entirely hiding it; not only do the scales in the fruit become fused into one mass, but 2–3 acorns generally become (through their scales) completely fused into one mass. This oak abounds on Tonglo from 7500 ped. alt. to 9000 ped. alt.

Juglans regia, L., was frequent at the Darjeeling level, but has been used up round the station for building-purposes, and I saw not one tree on the march to Tonglo and back.

Betula, sp., is frequent in the station of Darjeeling, and again near Tonglo top (? same species), but now without flower or fruit.

MENISPERMACEÆ.

I did not notice one example between Darjeeling and the top of Tonglo.

CUCURBITACEÆ.

Thladiantha calcarata, i. e. *Momordica calcarata*, Colebr., is common in Darjeeling station. My march to Tonglo supplied me with two new genera besides *Edgaria darjeelingensis*, which I have just sent as a new genus to the Linnean Society.

Edgaria darjeelingensis is abundant in Darjeeling station, and along the whole Tonglo ridge to 8000 ped. alt., filling the air with its fragrance. The male plants are far more numerous than the female. From 8000 to 9000 ped. alt. *Warea*, genus nov., is plentiful. And at the same level (but nearer Darjeeling) *Rampinia*, nov. genus, is abundant. It is remarkable that *Edgaria*, *Warea*, and *Rampinia*, now all in flower, agree in the following points: they are all large, social, rambling, dioicous Cucurbits with bifid tendrils and medium large yellow flowers. In all three the male plants are numerous, the peduncles often two from each axil, the first peduncle bearing a solitary flower, the second a raceme ebracteate of several flowers. The female plants are comparatively rare, with solitary flowers. The fruit in all three is the same size, shape, and nearly alike in ridges and marks, viz. trigonous with two ridges on each face, lanceolar, narrowed at both ends, 3–4 inches long, dehiscing by three valves from the top. It is this general resemblance conjunct with the dioicous flowers that has allowed these three very distinct genera (all to be got, too, in Darjeeling) to be overlooked.

I now give complete characters for the two new genera, *Warea* and *Rampinia*.

Outlines to illustrate structural peculiarities of the genus *Warea*.

Fig. 1.

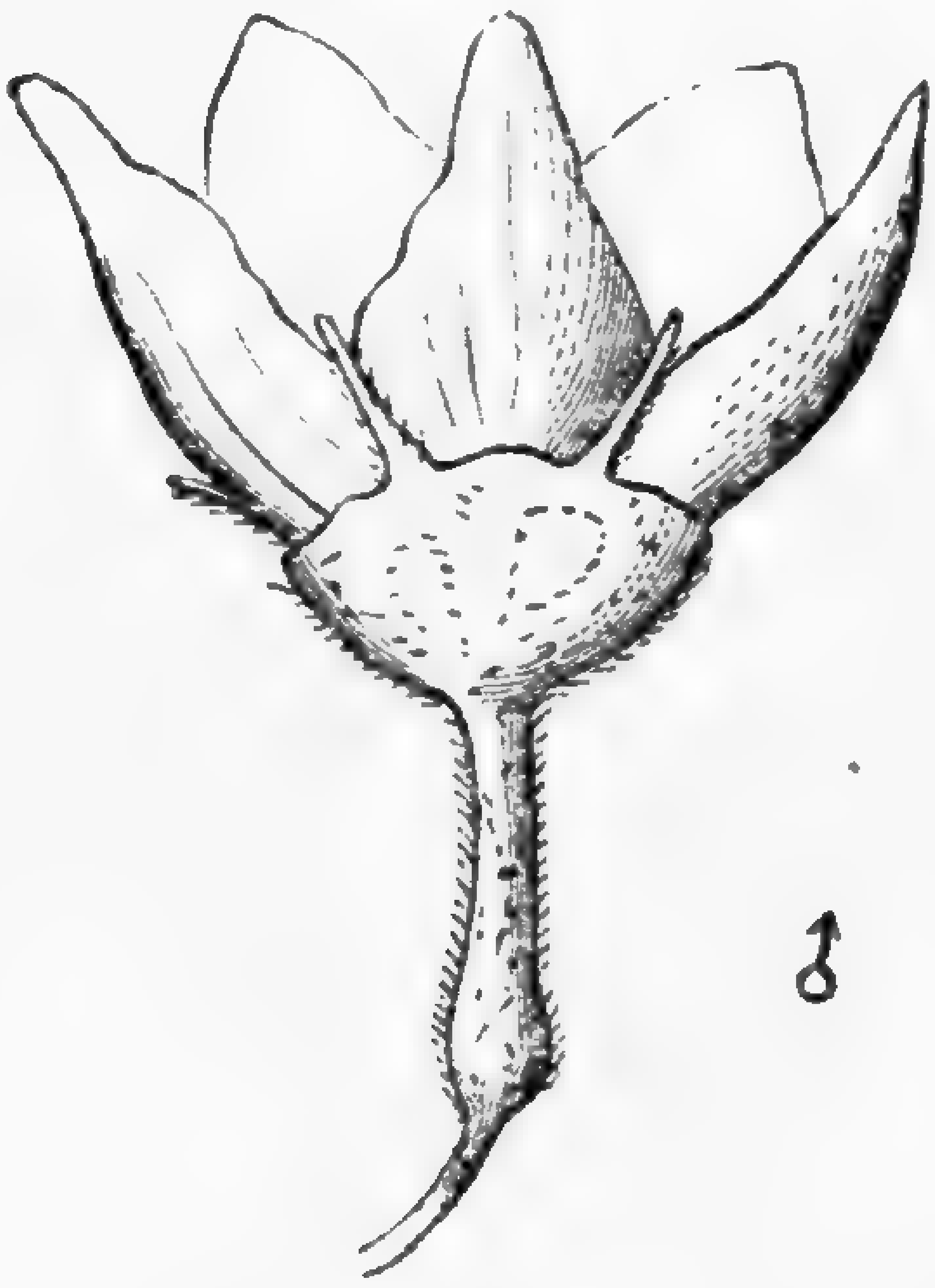


Fig. 2.

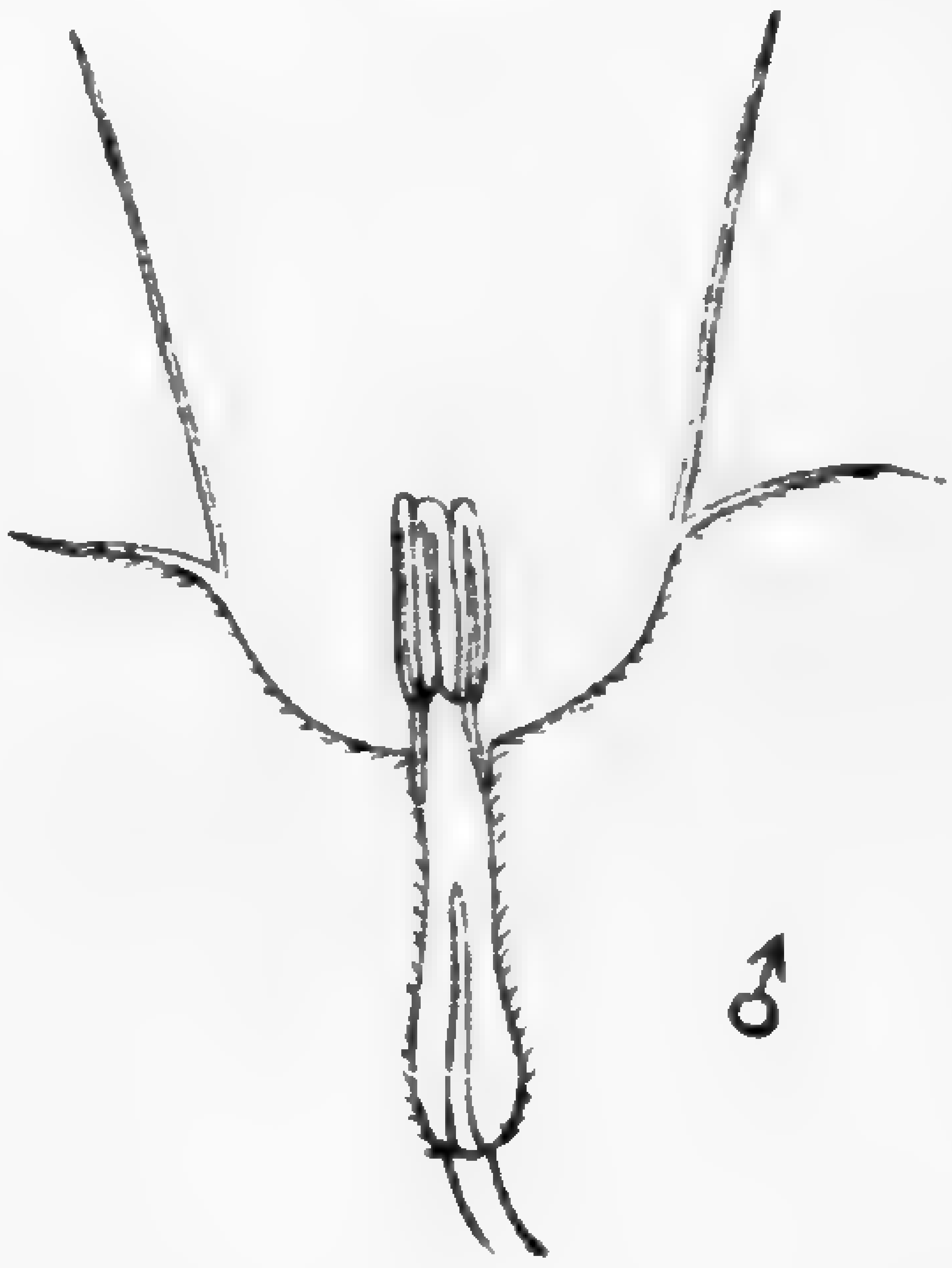


Fig. 3.

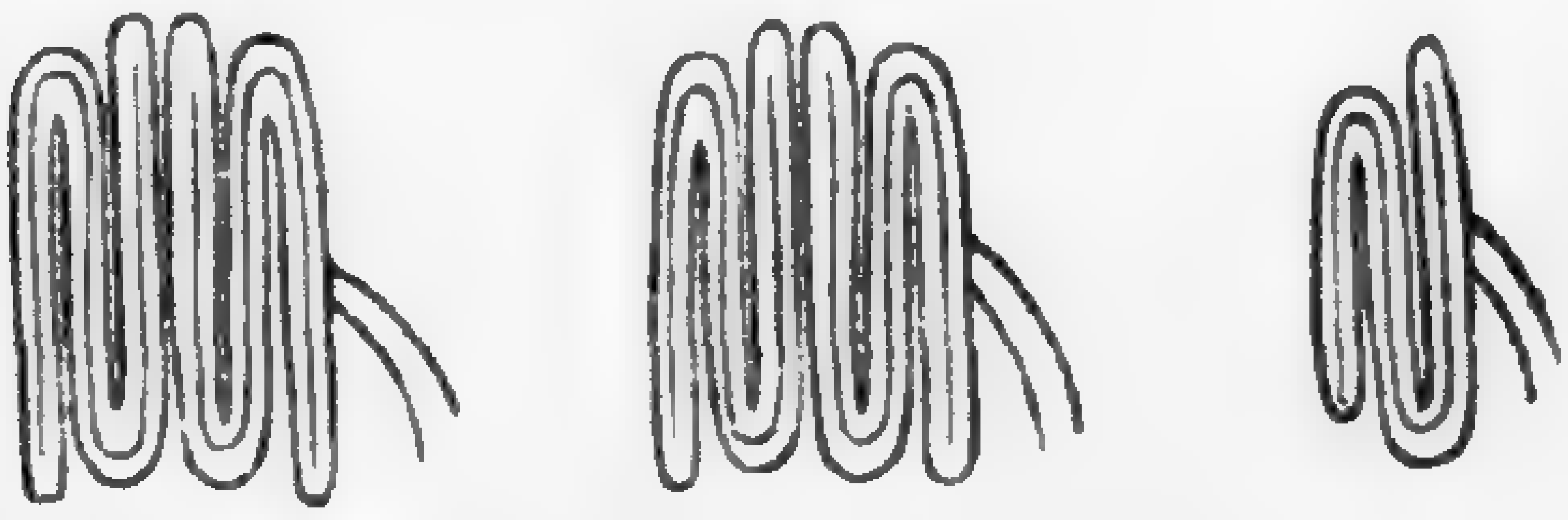


Fig. 1. The male flower, of natural size.
2. A vertical section of the male flower.
3. Stamens, magnified and cut apart.

WAREA, gen. nov.

Flores dioici. Flores ♂ ebracteati, sæpe e quaque axilla duo pedunculi oriuntur quorum alter uniflorus alter serius racemosus. Calycis tubus elongatus tubulosus apice subhemisphærice campanulatus, dentibus 5 lanceolato-subulatis. Corolla profunde 5-partita segmentis subovatis acutis. Stamina 3 superiore parte tubo calycis inserta, filamentis brevibus liberis: antheræ connatæ, una 1-locularis, ceteræ 2-loculares, loculis linearibus conduplicatis non transverse flexuosis, connectivo non producto. Ovarii rudimentum elongato-lanceolatum. Flores ♀ solitarii. Calyx et corolla maris. Staminum rudimenta obsoleta. Ovarium anguste ovoideum, 3-placentiferum: stylus filiformis stigmatibus 3 late obovatis: ovula ∞ horizontalia. Fructus exsuccus, subelongatus, basi attenuatus, 3-gonus, 3-

locularis, 6-costatus, intus fibrosus ab apice fere ad basin 3-valvis. Semina in quoque loculo biseriata c. 16, horizontalia complanato-ellipsoidea lævia, testa crassa, marginibus obtusis.

Herbæ scandentes. Cirrhi 2–3-fidi. Flores flavi, ♂ et ♀ longius pedunculati majusculi. Fructus c. 4-pollicaris.

Fig. 4.

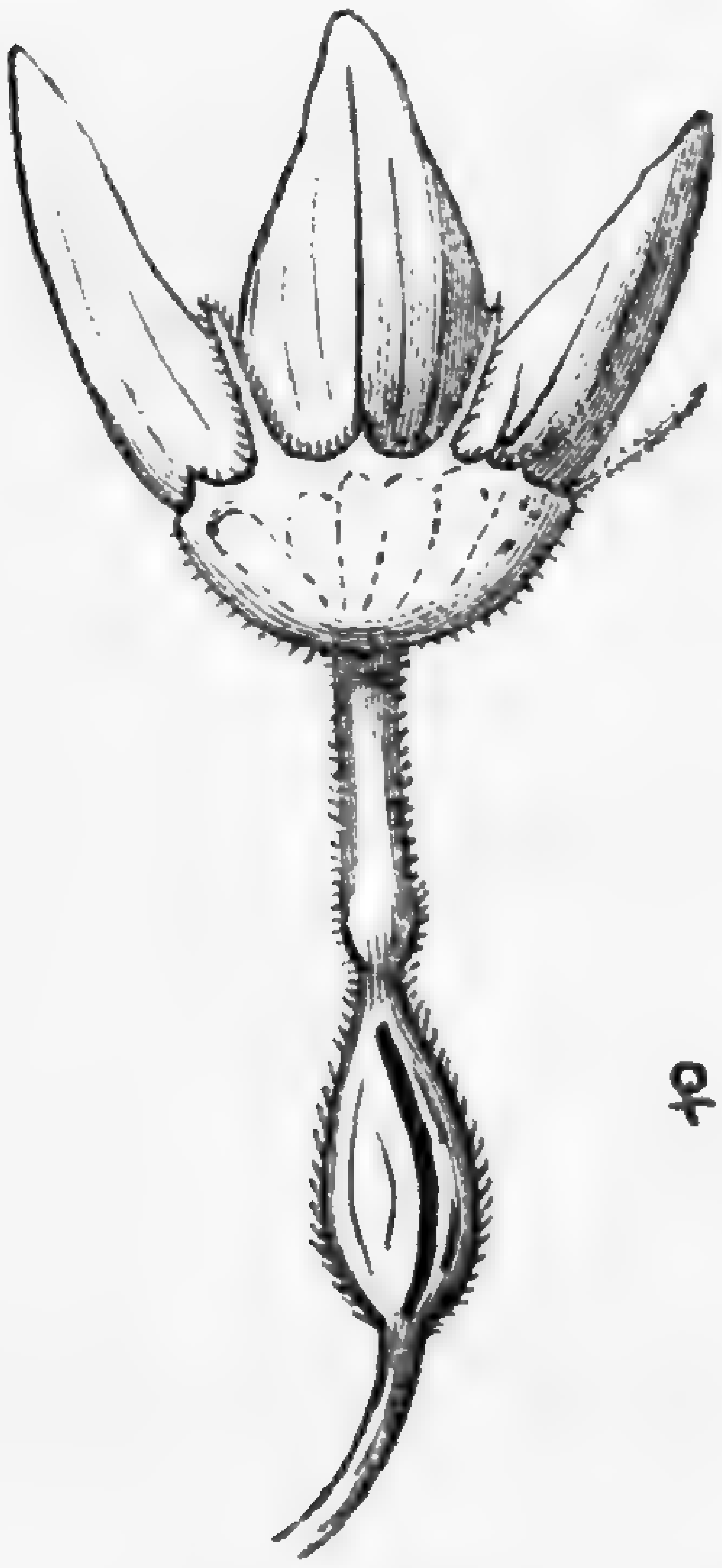


Fig. 5.

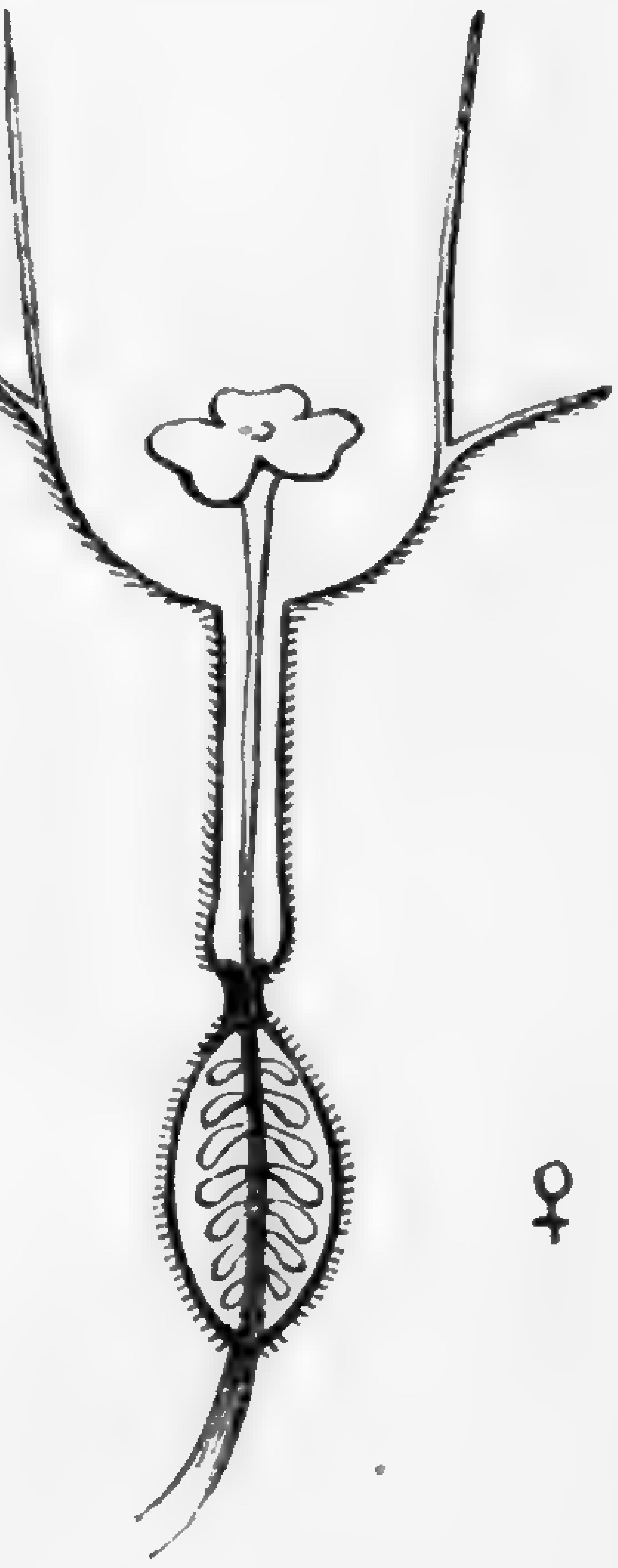


Fig. 6.

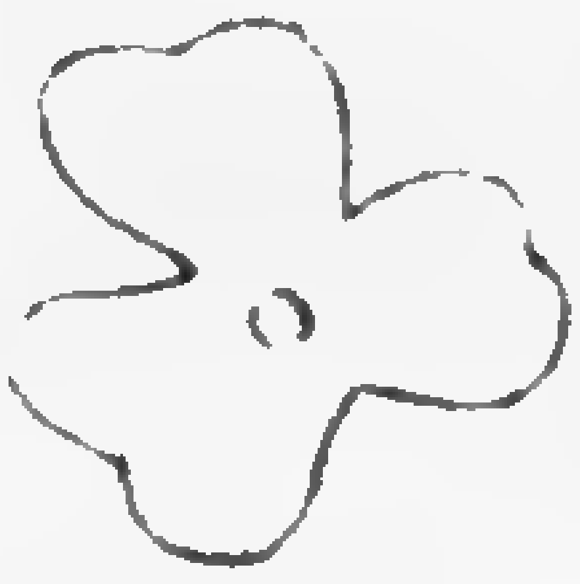


Fig. 4. Female flower of *Warea*, of the natural size.
5. A vertical section of the female flower.
6. The stigmas, seen from above.

Fig. 7.

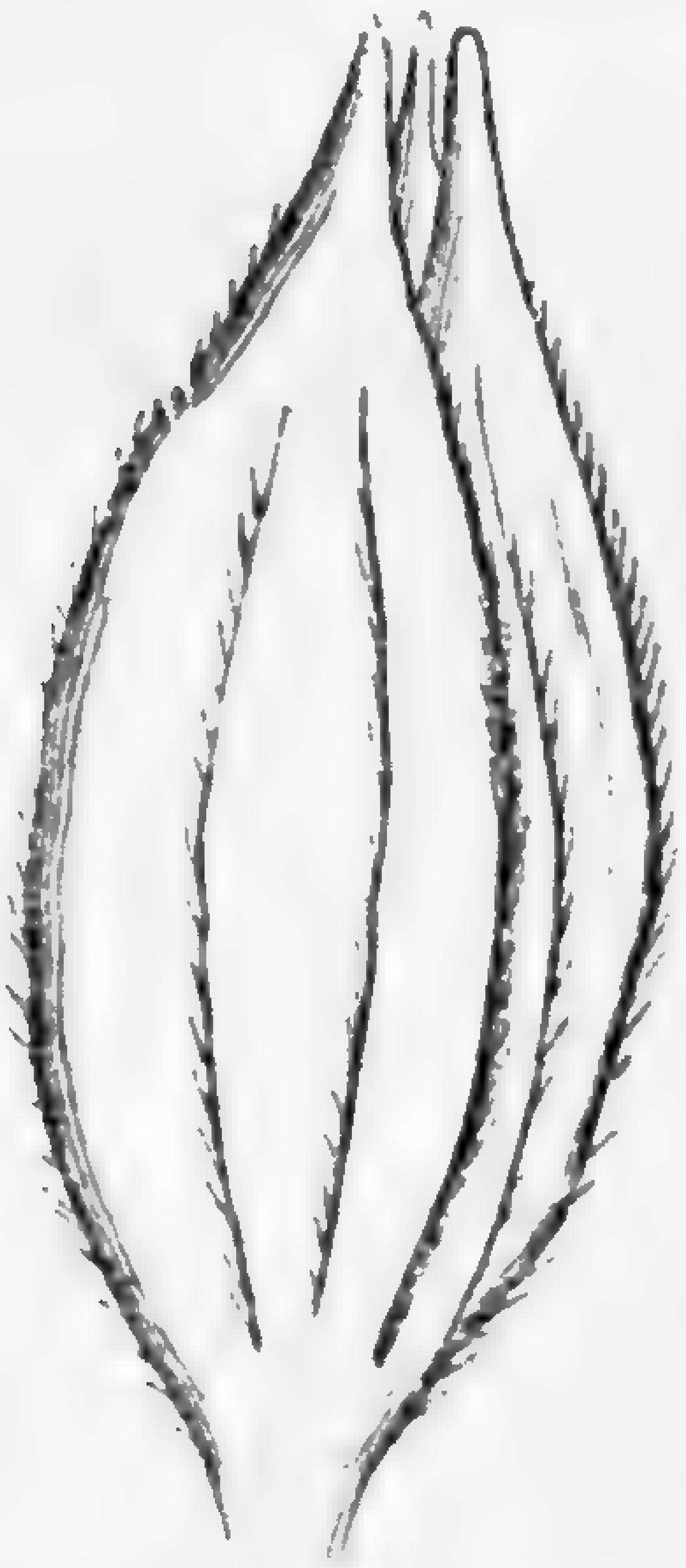


Fig. 8.

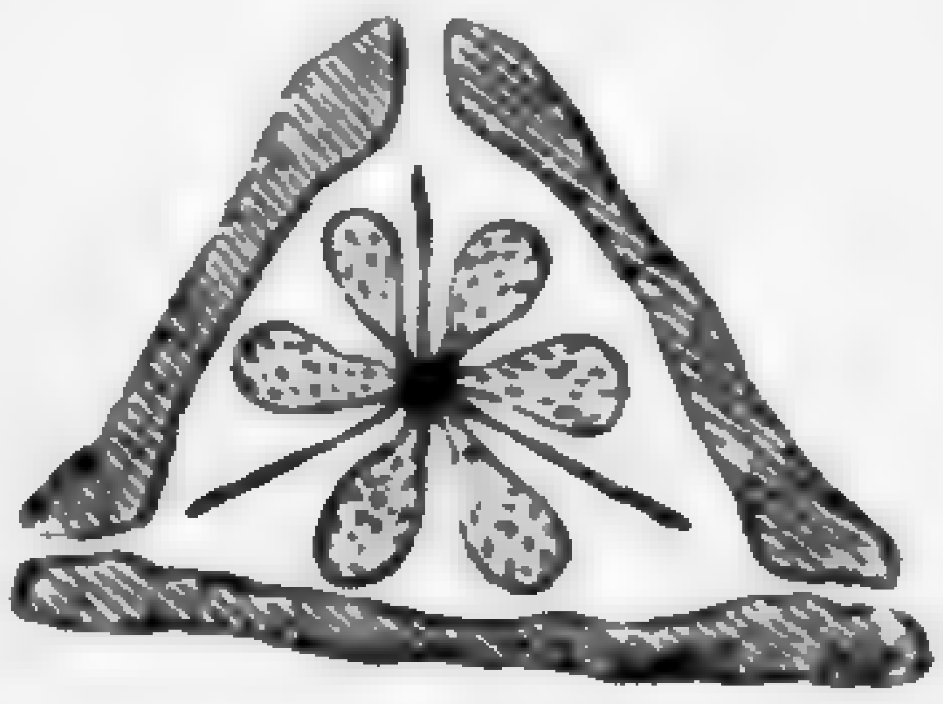


Fig. 7. Fruit, dehiscing.
8. A horizontal section of the capsule. It does not show the juiceless pulp in which the seeds are packed

Genus nulli alii proximum, forsan juxta *Gymnopetalum* locandum.

WAREA TONGLENSIS, *C. B. Clarke.* Caulis cum pedunculis fere glaber. Pedunculus ♀ 2-6-pollicaris. Ovarium ac fructus pilosa. Folia petiolata ovata basi altius cordata, supra sparsim pilosa subtus albescentia fere glabra, quoad formam valde variabilia, modo ovata acuta, modo trifida, modo fere ad basin in 5 lacinias angustas divisa.

RAMPINIA, nov. gen.

Flores dioici. Flores ♂ ebracteati, sæpe e quaque axilla duo pedunculi oriuntur quorum alter uniflorus, alter serius racemosus. Calycis tubus elongatus cylindricus subinfundibuliformis, dentibus 5 subulatis. Corolla profunde 5-partita segmentis anguste ovatis subacutis. Stamina 3 tubo calycis fere inclusa, filamentis brevibus liberis: antheræ in capitulum arcte connatæ, una 1-locularis, cæteræ 2-loculares loculis conduplicatis non transverse flexuosis. Ovarii rudimentum elongatum.—Flores ♀ solitarii brevi-pedunculati. Calyx et corolla maris. Staminum rudimenta 0.

Outlines illustrating anatomical structure of the genus *Rampinia.*

Fig. 9.

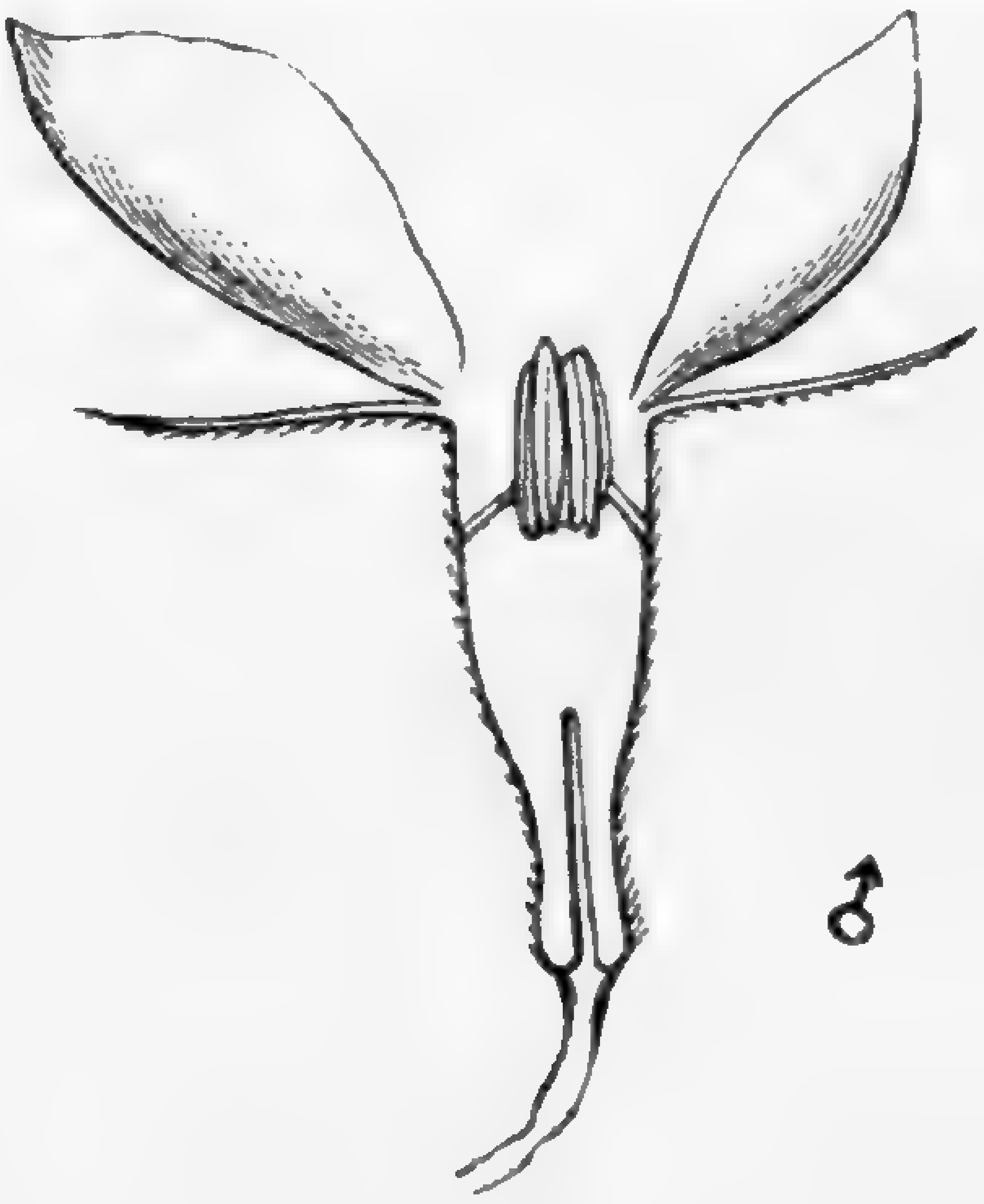


Fig. 10.

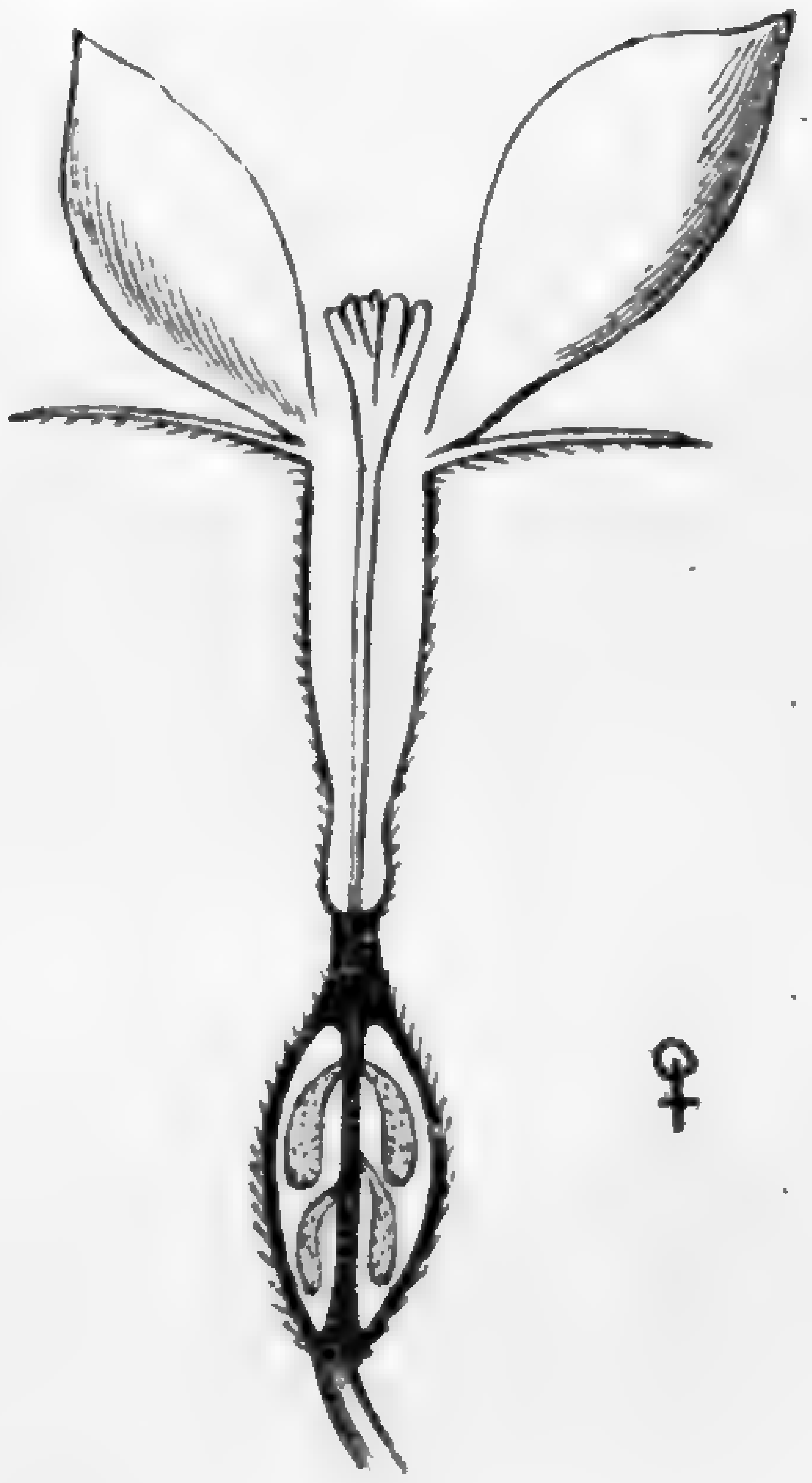


Fig. 11.

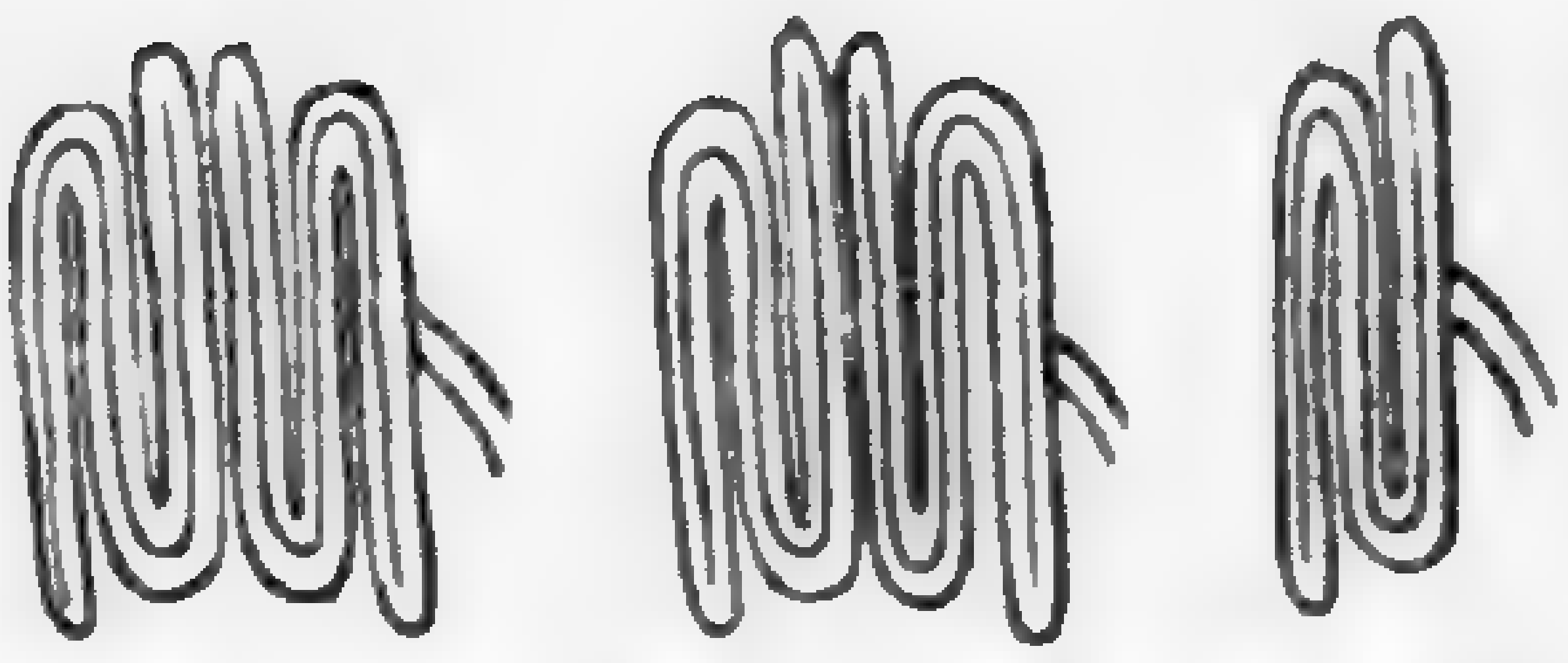


Fig. 12.

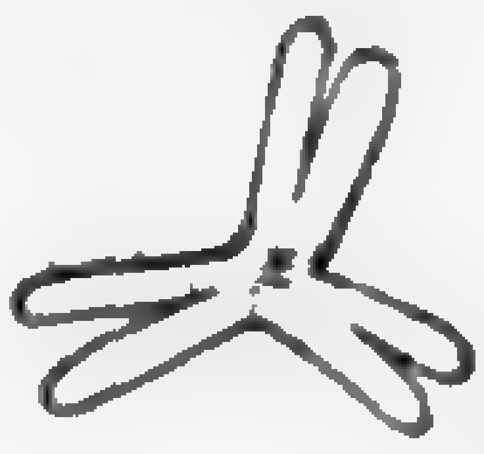


Fig. 9. A vertical section of the male flower, of natural size.

10. A vertical section of the female flower, of natural size.

11. Stamens, magnified and cut apart.

12. Stigmas, seen from above.

Ovarium fusiforme, apice attenuatum, 3-loculare: stylus elongatus 3-fidus, stigmatibus 3 bilobis: ovula in quoque loculo 4, pendula, biseriata. Fructus exsuccus, subelongatus, basi attenuatus, 3-gonus, 3-locularis, irregulariter sinuato-costatus, intus fibrosus, ab apice fere ad basin 3-valvis 12-spermus. Semina pendula anguste oblonga compressa, paullo rugosa, testa dura vix crassa, marginibus subacutis.

Herbæ scandentes. Cirrhi 2–3-fidi. Flores flavi majusculi. Fructus 3–4-pollicaris.

RAMPINIA HERPETOSPERMOIDES. Caulis cum foliis capsulaque molliter pilosus. Folia petiolata cordata ovata acuminata serrata, subincisa aut angulatim 3–5-lobata. Fructus pedunculi incrassati. Corolla externe paullo pilosa.

I think it possible, nay probable, that this is the Himalayan species of *Herpetospermum* called *H. pedunculosum*. I have no hesitation in giving it a new generic name, the ovules, fruit, and seeds being altogether unlike those of *Herpetospermum* as described. I have ample material for *Rampinia*, including the fruit of every stage, and I have examined the flowers and fruits on the growing plants.

Dr. King supposes with me, that *Herpetospermum* has been in some way constructed out of these three genera admixed, and suggests that it may have been described by joining a three-sided capsule of *Edgaria* (there are such, though the capsule is nearly always 6-seeded) to the male plant of *Rampinia*, and then adding the further blunder of supposing the seeds erect, and describing the hilum and pointed shoulder as a three-pointed summit to the seed.

If this is the true explanation of *Herpetospermum*, the sooner that name is entirely obliterated the better.

The three very remarkably allied genera *Edgaria*, *Warea*, and *Rampinia* are thus separated shortly:—

EDGARIA.

Anthers straight. Ovules in each cell two, pendulous, superimposed. Capsule containing 6 seeds.

WAREA.

Anthers conduplicate. Ovules in each cell 12–16, in two rows, horizontal. Capsule containing about 48 seeds.

RAMPINIA.

Anthers conduplicate. Ovules in each cell 4, in two rows, pendulous. Capsule containing 12 seeds.

Fig. 13.

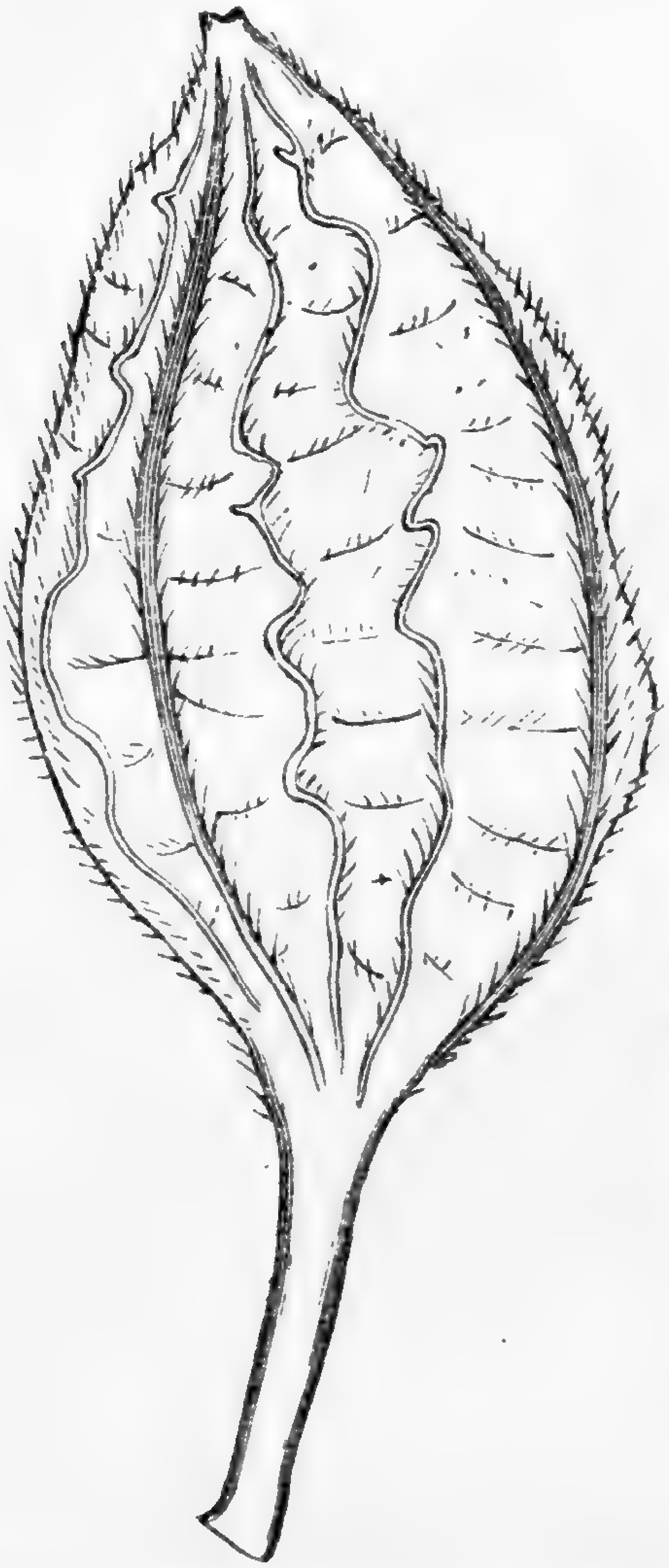


Fig. 14.

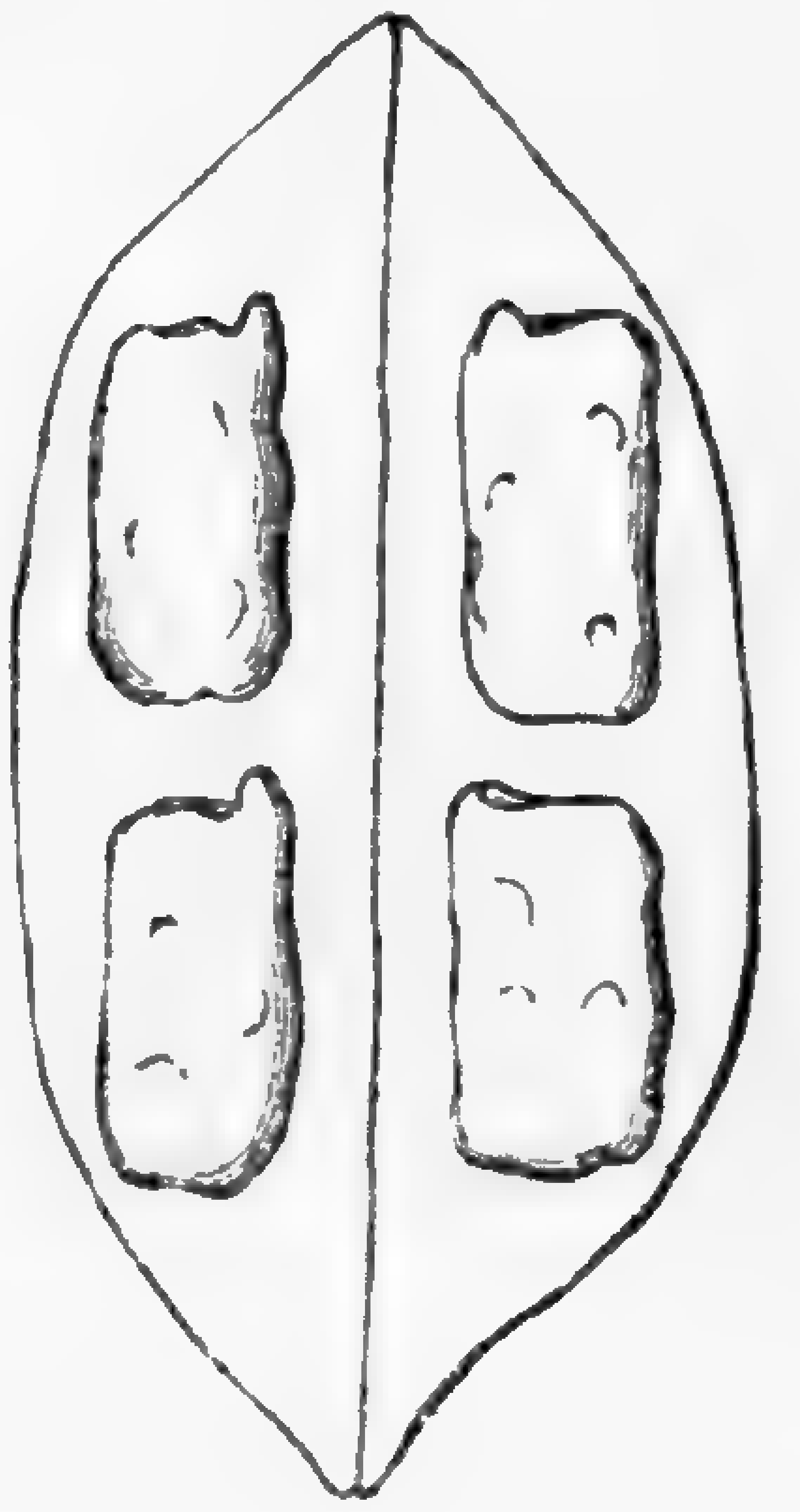


Fig. 15.

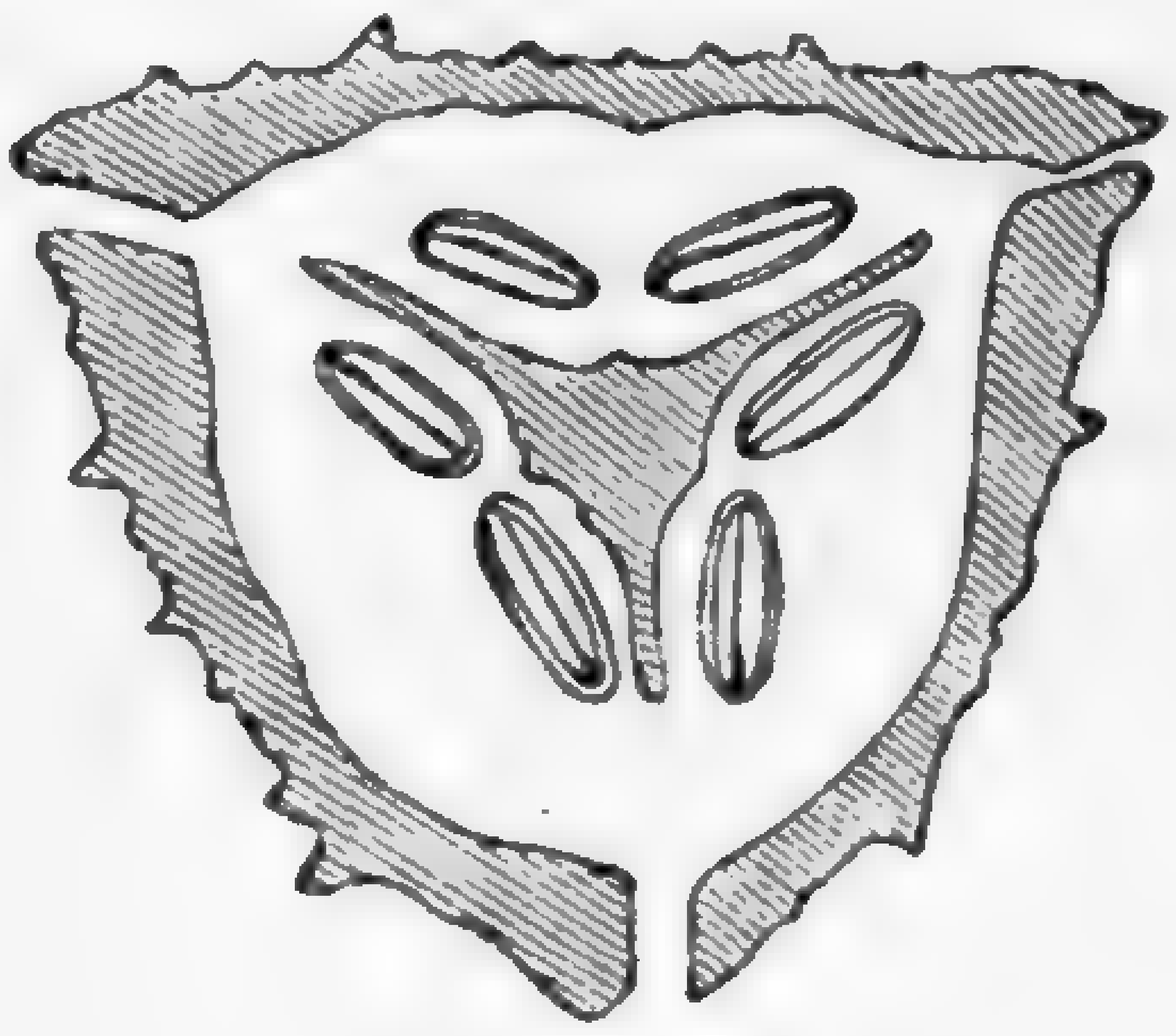


Fig. 13. A fruit of *Rampinia*, of natural size, just before dehiscence, and containing twelve seeds.

14. Four seeds, shown *in situ*, when one of the three values of the capsule is removed.

15. Horizontal section of the same fruit, the juiceless pulp in which the seeds are embedded not being show

BEGONIACEÆ.

Begonia Josephi, Alph. DC., is abundant from 7500–9500 ped. alt. ***B. gemmipara***, Hook. f. et. Th., is common from 8000–10,000 ped. alt. The gemmæ have much the same nature as other gemmæ; they become fusiform, with rootlets often, before they drop, and at once produce new plants.

There are other Begonias even above 7000 ped. alt., on this Tonglo ridge, but not now in flower.

VIOLACEÆ.

Dr. Hooker mentions violets on Tonglo; I noticed *Viola* from 8000–10,000 ped. alt., not in flower.

CRASSULACEÆ.

I saw none.

BRASSICACEÆ.

Only *Nasturtium montanum*, Wall., as a weed in the station at 7000–7500 ped. alt.

CAPPARIDACEÆ.

None.

STERCULIACEÆ.

None.

MALVACEÆ.

None.

TILIACEÆ.

ELÆOCARPUS LANCEÆFOLIUS, *Roxb.*

A tree 50 feet at 7400 ped. alt.; just past flowering.

POLYGALACEÆ.

POLYGALA ARILLATA, *Ham.*

Scattered at 7000–8000 ped. alt.

SAPINDACEÆ.

ACER CAMPBELLII, *Hook. f. et Th.* 7000–8000 ped. alt.

Plentiful.

A. CAUDATUM, *Wallich.* 8000–10,000 ped. alt.

Frequent.

A. HOOKERI, *Miq.* 9000–10,000 ped. alt.

DOBINEA VULGARIS, *Ham.*, in Darjeeling at 7000 ped. alt.

Not abundant; and I found a plant on Tonglo above 9000 ped. alt.

TURPINIA POMIFERA, *DC.* 7000–8000 ped. alt.

Frequent; flowered three months ago.

TERNSTRÖMIACEÆ.

EURYA JAPONICA, *Thbg.* 7000-8000 ped. alt.
Common.

ACTINIDIA CALLOSA, *Lindl.* 7000-8000 ped. alt.
Common.

SAURAUJA NAPAULENSIS, *DC.* 7000-8000 ped. alt.
Common.

HYPERICACEÆ.

HYPERICUM PATULUM, *Thbg.* Abounds in the station and on cleared ground up to 8000 ped. alt.

H. HOOKERIANUM, *W. & A.* 9000-10,000 ped. alt.
Common in open spots.

H. NAPAULENSE, *Choisy.* In the marshes on Tonglo top at 10,000 ped. alt.

There is no *Hypericum* seen in the dense forest which borders the road nearly all the way from Darjeeling to Tonglo.

MAGNOLIACEÆ.

MICHELIA EXCELSA, *Bl.* 7000-7500 feet.
A large tree now in flower (Sept.).

MAGNOLIA CAMPBELLII, *Hook. f. et Th.* 8000-10,000 feet.
Plentiful (flowers in spring).

SCHIZANDRA PROPINQUA, *Hook. f. et Th.* 7000-8000 ped. alt.
Frequent.

ANONACEÆ.

None.

DILLENIACEÆ.

None.

RANUNCULACEÆ.

CLEMATIS BUCHANANIANA, *DC.* 7000-10,000 ped. alt.
Common; coming into flower.

CLEMATIS, sp.
(Perhaps *montana*, Ham.), not in flower. Near Tonglo Top.

ANEMONE.
I collected none, the season being September. There doubtless is the genus on Tonglo, as Hooker states.

THALICTRUM CHELIDONII, *DC.* On Tonglo at 10,000 ped. alt.

Plentiful. This is the common *Thalictrum* with large blue flowers and compressed falcate fruit-carpels; but it does not fit the description in the Kew Flora at all well: the stems are often 40-flowered instead of 2-8-flowered as stated: there are often 16 flowers on one branch even. Also the leaves are pubescent beneath, the anthers not mucronate.

RANUNCULUS DIFFUSUS, *DC.* 9000-10,000 ped. alt.

ACONITUM PALMATUM, *Don.* 10,000 ped. alt.
In quantity.

Dr. Hooker mentions Ranunculaceæ as conspicuously absent on Tonglo: this can hardly be said.

PAPAVERACEÆ.

MECONOPSIS ROBUSTA, *Hook. f. et Th.* On Tonglo at 10,000 ped. alt. The flowers are a very pale cold blue, thin in texture. The whole plant is softly pilose and also covered with scattered golden rough setæ.

FUMARIACEÆ.

DICENTRA THALICTRIFOLIA, *Hk. f. et Th.* 7000-10,000 ped. alt.
Very common.

CORYDALIS SIBIRICA, *Pers,* On Tonglo top at 10,000 ped. alt.

C. CHÆROPHYLLA, *DC.* 9000-10,000 ped. alt.
Abundant.

These Fumariads are in great quantity on Tonglo; and I suppose that when Dr. Hooker says Fumariaceæ are conspicuously absent from Tonglo, this statement must be narrowed to the month of May.

BERBERIDACEÆ.

HOLBŒLLIA LATIFOLIA, *Wallich.* 7000-10,000 ped. alt.
Common.

BERBERIS ARISTATA, *DC.* Tonglo top at 10,000 ped. alt.

VITACEÆ.

VITIS TENUIFOLIA, *W. & A.*
I collected at 9000 ped. alt.

V. CAPRIOLATA, *Don.* 7000-8000 ped. alt.

Common.

These were the only two vines I collected; there are others, now (Sept.) turned red, which decorate the trees. There is one vine abundant throughout the Darjeeling station (and district at 5000–10,000 ped. alt.), and abundant all the way to Tonglo, but, I believe, quite undescribed. Though so common in the station, it never flowers till it has attained its full size; it is the largest vine I am acquainted with, and flowers at the top of the tall trees when its stem is a foot in circumference. I append an imperfect description, my good specimens not being at hand.

VITIS, sp. Folia primordialia indivisa ovata valde acuminata: cætera tripartita; foliola petiolata 4–8-pollicaria late elliptica basi cordata apice obtusa vel subito breviter acuminata, margine continuo minute denticulato, supra glabrata subtus minute pilosa venis venulisque conspicue elevatis reticulatisque. Foliola lateralia valde secunda falcata basi uno latere auriculato-cordata. Cirrhi bifidi. Cymæ magnæ compositæ ramis angulatis divaricatis.

PITTOSPOREÆ.

PITTOSPORUM FLORIBUNDUM, *W. & A.* 7000–8000 ped. alt.
Frequent.

OLACACEÆ.

None.

ERICACEÆ.

ANDROMEDA OVALIFOLIA, *Wallich.* 7000–9000 ped. alt.
Abundant; flowered a month ago, *i. e.* end of July.

PERNETTYA REPENS (Gualtheria nummularioides, *Don*). 7000–10,000 ped. alt.
Abundant; now in flower.

The Rhododendrons are now (Sept.) not in flower. On Tonglo from 9000 feet upwards, *Rhododendron arboreum* is the prevailing tree, or rather giant bush. I collected also at 9000 feet *R. barbatum*, Wallich, and at Tonglo top *R. Falconeri*, Hook. There also grows here *R. argenteum* as mentioned by Hooker (which I have collected on this ridge on other occasions), and probably one or two species more. *R. arboreum* varies a good deal in the tinge of its flowers, and has been supposed to include two or more species.

RUTACEÆ.

BOENNINGHAUSENIA ALBIFLORA, *Reich.* 8000 ped. alt.
Abundant.

ZANTHOXYLUM ALATUM, *Roxb.* 7000–8000 ped. alt.
Frequent.

SKIMMIA LAUREOLA, *Hook. f.* Tonglo top, in quantity
Now in fruit (Sept.).

MELIACEÆ.

None.

ANACARDIACEÆ.

RHUS. 7000–8000 ped. alt.

A tree, a common species; but I have forgotten the name. Frequent.

SABIACEÆ.

MELIOSMA (? pinnata, *Planch.*). 7000–8000 ped. alt.
A fine tree; flowered in June.

LINACEÆ.

ANISADENIA SAXATILIS, *Wall.* 7000–8000 ped. alt.
Frequent.

GERANIACEÆ.

GERANIUM POLYANTHES, *Edgw. & Hook. f.*
Covers the open grass on Tonglo top.

G. NEPALENSE, *Sweet.* 7000–8000 ped. alt.
Common.

IMPATIENS PUBERULA, *DC.* At 7500 ped. alt.

I. ARGUTA, *Hk. f. et Th.* 7000–8000 ped. alt. Sepals often 4. Large inflated spur, dull pink-purple, no trace of yellow. The leaves with very close sharp (not deep) serratures.
Common.

I. SPIRIFER, *Hk. f. et Th.* 7000–10,000 ped. alt.

Most abundant. My plant, thus referred, is quite different from *I. arguta.* It also has frequently four sepals. But the large inflated spur is yellowish with marked pink-purple striations. The leaves are crenate-serrate, with far more distant serratures than on *I. arguta.* *I. spirifer* in the wet woods is often little branched, 1–2 feet high, the flowers often solitary; but the peduncle then carries a number of bracteolæ devoid of pedicels. Above, on the sunny open slopes of Tonglo (where the ground in September was covered with this plant), it was low, very much branched, and densely covered with flowers, the peduncles often branched, with 3–6 flowers on each.

Impatiens longipes, *Hk. f. et Th.* 7000-8000 ped. alt.
In wet beds of *Elatostema*; frequent.

I. radiata, *Hook. f.* 7000–10,000 ped. alt.

Frequent and abundant on the cleared spaces at 9000–10,000 feet.

Impatiens, sp. On Tonglo at 9000 ped. alt. Peduncles 4–8, from the upper crowded axils, 6–10 inches long; pedicels whorled at intervals along these branches. Bracts persistent. Flowers large, yellow, the wing-tips brown-orange. Spur not long, incurved.
Plentiful.

Leaves and inflorescence of *I. radiata*, but the flowers large and brown-orange instead of small and pink. The pods and seeds are also similar, but larger.

I. stenantha, *Hk. f.* 7000-8000 ped. alt.
In wet beds of *Elatostema*; frequent.

I. racemosa, *DC.* 7500 ped. alt.

Caryophylleæ.

Stellaria crispata, *Wall.* 7000–10,000 ped. alt.
Common.

S. sikkimensis, *Hk. f.* 7000–10,000 ped. alt.
Abundant.

S. longissima, *Wall.* 7000-8000 ped. alt.
Rare.

Polygonaceæ.

Rheum was found by Dr. Hooker; I did not see it.

Rumex nepalensis, *Spreng.* 7000–10,000 ped. alt.
Common. Does *R. hamatus*, Trevir., differ?

R. acetosa, *L.* 8000 ped. alt., advena.

Polygonum filicaule, *Wall.* 9000–10,000 ped. alt.

P. perforatum, *Meisn.* 9000–10,000 ped. alt.

P. capitatum, *Ham.* 8000–10,000 ped. alt.
Common.

P. RUNCINATUM, *Ham.* 7000–10,000 ped. alt.

Abundant.

P. CHINENSE, *L.* 7000-9000 ped. alt.

Abundant. Why is this plant not *Coccoloba*? *Polygonum* is specially defined as having a dry calyx in fruit, *Coccoloba* a baccate calyx in fruit.

P. MOLLE, *Don*; i. e. *Coccoloba totnea*, Ham. Abundant in Darjeeling station and up to 9000 ped. alt.

The fruit of this is distinctly baccate, the sepals coalescing and becoming thick and succulent, so that the fruit is extensively eaten under the native name of *Totnye*. Why is Hamilton wrong in calling this *Coccoloba*?

P. CRISPATUM; i. e. *Coccoloba crispata*, Ham. 9000–10,000 ped. alt.

Abundant. A most beautiful plant, the large numerous flowers varying from white to rose, This is a true *Polygonum*, *i. e.* the sepals quite dry on the fruit. It is at once (when out of flower) recognized from all other Polygonums by the parallel veins of the leaves. I add a description :—

P. CRISPATUM, *Ham.*, sub *Coccoloba*. Erecta ramosa 4–6-pedalis ramis lanato-pilosis. Ochreæ breves latæ scariosæ pilosæ margine subintegro. Folia petiolata elongato-lanceolata integra supra viridia sparsim pilosa, subtus argenteo-tomentosa venis (20–30 paribus) exacte parallelis utrinque insigniter ornata. Corymbi laxe subdichotomo-paniculati: flores laxi pro genere majusculi: bracteolæ rotundatæ fere glabræ. Stamina 7–8. Styli 3 ad basin liberi apice capitati. Achænium ovatum acute triquetrum, sepalis siccis marcescentibus laxe circumdatum.

Species eximia a *P. chinensi* (cui a cl. Meisner reducta est) longe remota.

There are several other species of *Polygonum* that may be collected at 7000–8000 ped. alt.; the above were all I got on Tonglo itself. The beautiful Himalayan Polygonums of the section *Bistorta* (e. g. *P. sphærostachyum*, Meisn., *P. amplexicaule*, Don, *P. affine*, Don, and their allies) do not come down quite so low as Tonglo top (10,000 feet.)

FAGOPYRUM, sp. foliis hastatis. 9000 ped. alt.

AMARANTACEÆ.

ACHYRANTHES (JAVANICA ? *Tand.*). 7000–8000 ped. alt. Plentiful.

A. SCANDENS, *Hk. f. et Th. in MS.* 7000–9000 ped. alt.

Plentiful. A very large climber, ascending trees 60 feet high and completely covering them with its large white spikes. One of the most striking of Darjeeling plants, called sometimes the Hop-creeper by the English.

PIPERACEÆ.

PIPER (? PEDICELLATUM, *Cas., DC.*). 7000–8000 ped. alt.

CHAVICA SPHÆROSTACHYA, *Miq.* 7000–8000 ped. alt. Frequent.

PEPEROMIA HEYNEANA, *Miq.* 7000–8000 ped. alt. Frequent.

These are the only three Peppers which I collected; but there are doubtless others that come above the 7300-feet level at which I started.

THYMELACEÆ.

DAPHNE WALLICHII, *Meisn.* 7500 ped. alt.

In bud. I believe I also saw *D. papyracea*, Wallich, at 9000 ped. alt.

LAURACEÆ.

The Laurels are abundant along the Tonglo (and other similar ridges) at 7000–9000 ped. alt.; but now (Sept. 15) I saw none in flower. I collected leaves of the following only: –

CINNAMOMUM OBTUSIFOLIUM, *Nees*. A single plant at 7000 ped. alt.

TETRANTHERA ANGUSTIFOLIA, *Wall.* 7500 ped. alt.

T. (? SIKKIMENSIS, *Meisn.*). 8000 ped. alt.

TETRANTHERA, sp. 8000 ped. alt.

DAPHNIDIUM ELONGATUM. *Nees*. 7000–9000 ped. alt.

LITSÆA (FOLIOSA, *Nees* ?). 8000 ped. alt.

ACTINODAPHNE, sp. 7000–8000 ped. alt.

A tree 80 feet high, with very long (and pilose), narrow, obovate leaves. The fruit is eaten by the natives. The flowers I have not seen; but Mr. Gamble tells me it is surely *Actinodaphne* (genus).

LEGUMINOSÆ

are conspicuously absent the whole way from Darjeeling to Tonglo top, the only plant seen being *Parochetus communis*, Ham., which comes up profusely wherever the small bamboo-jungle is cleared by burning. *Trifolium repens*, L., has spread round the station at 7000–9000 ped. alt. An *Erythrina*, a small upright tree with showy flowers, is planted all over the station; it is near *E. arborescens*, Roxb. There is one branch of a *Desmodium* with pale pink flowers on the Station Mall at 7300 ped. alt., which may be indigenous, as the species (of which I have forgotten the name, perhaps *D. confertum*, DC.) is common at 6000 ped. alt. *Mucuna macrocarpa*, Wallich, just reaches the 7000-feet level. *Piptanthus nepalensis*, Don, is planted at Darjeeling; and I have found it at 10,000–12,000 ped. alt. on the ridge immediately north of Tonglo; but I did not see it on my present excursion.

The sum is, that in the wet forest-jungles of Sikkim, at 7000–10,000 ped. alt., one may walk for days without seeing one single Leguminose plant.

ROSACEÆ.

PRUNUS.

A Cherry is mentioned on Tonglo by Dr. Hooker; but in September I did not collect it.

SPIRÆA CALLOSA, *Thunb.* 7500 ped. alt.

NEILLIA THYRSIFLORA, *Don.* 7000–8000 ped. alt.
Common.

RUBUS ROSÆFOLIUS, *Smith.* 7000–9000 ped. alt.
Common.

R. BETULINUS, *Don.* 7000–8000 ped. alt.
Frequent.

R. PANICULATUS, *Smith.* 7000–9000 ped. alt.
Common.

R. PENTAGONUS, *Wallich.* 7000–9000 ped. alt.
Abundant.

RUBUS. The "yellow raspberry" of *Dr. Hooker.*
Abundant. In fruit in June at 7000–8000 ped. alt.

Rubus. The "ground-raspberry" of *Dr. Hooker.*

Abundant. In fruit in August at 7000–9000 ped. alt.

Rubus, sp. Stem and petioles dark-coloured and glandulose-pubescent. Leaves completely tripartite. Leaflets ovate or elliptic acuminate, very sharply serrate, silver-sericeous beneath, with 15–25 pairs of parallel veins. Panicles compound, from the upper axils. Sepals tomentose, and with bristly glands.

This *Rubus* is common at 7000–9000 ped. alt.

Rubus, sp. Stem and peduncles adpressed, silver-silky. Leaves digitately quinquefid to the base. Leaflets narrow, lanceolate, very closely serrate, silver-sericeous beneath, with 40–50 pairs of very close parallel veins. Flowers in small short clusters, chiefly in the lower axils. Sepals adpressed, white, silky.

Abundant at 8000 ped. alt.

These two *Rubi* are not new, but have names which I have forgotten. The following species was sent to me by Dr. King; and I afterwards collected it on many occasions.

R. macrocarpus, *King, MS.* Viridis laxe molliter pilosa. Stipulæ magnæ valde latæ alte fimbriatæ. Folia tripartita, foliolis latis serratis subtus reticulato-venulosis. Pedunculi ex axillis superioribus orti 2-pollicares, 1-flori. Sepala $1\frac{1}{2}$ unciam longa ovata caudata margine integro at sæpe segmentis lanceolatis subulatisque aucta, dorso setis deflexis munita. Petala magna alba rotunda. Carpella valde numerosa: in fructu interiora drupacea (omnino *Rubi*), exteriora (in fructu maturo) herbacea viridia pilosa longe lanceolata supra interiora conice conniventia. Fructus quam cæterorum *Ruborum* duplo major.

In Sikkim ad 8000–9000 ped. alt. Sat frequens.

This *Rubus*, which is plentiful both on the Tonglo and Sinchul ridges, is remarkable by its very large fruits, which are green when ripe; but on then separating them, the interior carpels are seen to be succulent, though the outer are elongate lanceolate herbaceous. It might easily be made a new genus; but the habit is exactly that of *Rubus.*

Dr. King had completely examined and described this remarkable species in MS. last year, but reserved publication; and Mr. Kurz tells us that there has since appeared in some German periodical a description taken from a dried herbarium scrap. In this case not only does Dr. King lose his name, but botany suffers the loss that the species starts from a less perfect original description.

FRAGARIA VESCA, *L.* 7000–9000 ped. alt.

Common.

AGRIMONIA EUPATORIUM, *L.* 7000–8000 ped. alt.

Frequent.

POTENTILLA NEPALENSIS, *Hook.* 7000–9000 ped. alt.

Frequent.

P. LEUCONOTA, *Don.*

Abundant in Darjeeling station and up to 8000 ped. alt. (Don's name has been superseded by one of Wallich's; but I forget which.)

POTENTILLA, sp. Plant erect, 1 foot high, branched with yellow flowers. Root-leaves long, deeply pinnatifid, with 10–20 pairs of segments; stem-leaves ternate or pinnate, with 2–4 pairs of segments. Leaves green on both sides, but with many lax white hairs. Sepals 10, subquadrate, striate, deeply 3–5-toothed.

Plentiful on Tonglo top at 10,000 feet, where Dr. Hooker mentions *Potentilla* as absent.

ROSA SERICEA, *Lindl.* On Tonglo top at 10,000 ped. alt.

PYRUS (ARIA) LANATA ? *Don.* Tonglo, 9000–10,000 ped. alt.

Frequent. This is the tree 30–40 feet high, with a large dense head, mentioned by Hooker.

P. (SORBUS)? INDICA, *Wallich.* Tonglo, 10,000 ped. alt.

SAXIFRAGACEÆ.

ASTILBE RIVULARIS, *Don.* 7000–9000 ped. alt.

Very common. (Stamens five here, never ten, as described.)

SAXIFRAGA.

None. They are plentiful at higher levels; but Tonglo, 10,000 feet, is too low for a single species. The same applies to *Parnassia.*

HYDRANGEA ROBUSTA, *Hook. f. et Th.* 7000–8000 ped. alt.

Common. Flowers in August and September.

H. VESTITA, *Wallich.* 9000–10,000 ped. alt.

A tree, generally with a definite trunk. Flowers in July and August.

DICHROA FEBRIFUGA, *Lons.* 7000–8000 ped. alt.

Abundant.

RIBES (GLACIALE? *Wall.*). On Tonglo at 10,000 ped. alt.

Epiphytic, as mentioned by Hooker; but I collected leaves only.

RHAMNACEÆ.

I collected none.

CELASTRACEÆ.

CELASTRUS STYLOSA, *Wallich.* 7000 ped. alt.

STYRACEÆ.

STYRAX SERRULATUM, *Roxb.* 8000 ped. alt.

SYMPLOCOS (RACEMOSA? *Roxb.*). 7000–8000 ped. alt.
Plentiful.

SYMPLOCOS, sp. 9000–10,000 ped. alt.

ILICINEÆ.

ILEX INSIGNIS, *Hook. f.* At Darjeeling, 7000–7500 ped. alt.
Plentiful.

I. (DIPYRENA? *Wallich*). 9000–10,000 ped. alt.
I collected leaves only.

APOCYNACEÆ.

None collected.

GENTIANACEÆ.

GENTIANA PEDICELLATA, *Wallich.* 8000 ped. alt.
Common. Will flower by end of October.

CRAWFURDIA LUTEO-VIRIDIS, *C. B. Clarke.* 7000–10,000 ped. alt.
Frequent.

OPHELIA PANICULATA, *Don.* 7000–8000 ped. alt.
Common.

O. CHIRATA, *Griseb.* 8000–9000 ped. alt.
Sparsely.

SWERTIA BIMACULATA, *Hk. f. et Th.* 7000–9000 ped. alt.
Abundant.

OLEACEÆ.

Dr. Hooker mentions *Olea*, which I know is on Tonglo; but I did not collect it.

SOLANACEÆ.

SOLANUM DECEMDENTATUM, *Roxb.* 7000–8000 ped. alt.

ASCLEPIADACEÆ.

I collected none.

CONVOLVULACEÆ.

I collected none.

PRIMULACEÆ.

LYSIMACHIA DEBILIS, *Wall.* 7000–8000 ped. alt.
Frequent.

L. EVALVIS, *Wall.* 7000–8000 ped. alt.
Common.

L. RAMOSA, *Wall.* 7000–8000 ped. alt.
Common.

Dr. Hooker found on Tonglo in May an *Anagallis* (near *A. tenella*) and a purple Primrose.

MYRSINACEÆ.

EMBELIA FLORIBUNDA, *Wall.* 7500 ped. alt.

BORAGINACEÆ.

CYNOGLOSSUM FURCATUM, *Wallich.* 7000–10,000 ped. alt.
Common in open places.

LABIATÆ.

PLECTRANTHUS STRIATUS, *Bth.* 9000–10,000 ped. alt.
Plentiful. The whole plant has a black-red tinge.

ELSHOLTZIA FLAVA, *Bth.* 8000 ped. alt.
An intensely aromatic species.

E. STROBILIFERA, *Bth.* 9000–10,000 ped. alt.
Abundant.

PERILLA OCIMOIDES, *L.* 7000–8000 ped. alt.
Plentiful.

CALAMINTHA UMBROSA, *Bth.* 7000–9000 ped. alt.
Common.

MELISSA PARVIFLORA, *Bth.* 7000–8000 ped. alt.
Frequent.

PRUNELLA VULGARIS, *L.* 7000–10,000 ped. alt.
Common.

SCUTELLARIA, sp. 7500 ped. alt.

CRANIOTOME VERSICOLOR, *Reich.* 7000–8000 ped. alt.
Common.

COLQUHOUNIA, nov. sp. Darjeeling, at 7000 ped. alt.
Plentiful. A pyramidal tree with simple, erect, conical trunk, attaining 30 feet height, was in fruit in June.

NOTOCHÆTE HAMOSA, *Bth.* 7000–9000 ped. alt.
Very common.

VERBENACEÆ.

PREMNA INTERRUPTA, *Wall.* 7000–8000 ped. alt.

CYRTANDRACEÆ.

ÆSCHYNANTHUS BRACTEATA, *Wallich*, β. PEELII, *Hk.f.* 7000–8000 ped. alt.
Plentiful.

LYSIONOTUS TERNIFOLIA, *Wall.* 7000–7500 ped. alt.
Rather scarce at this its upper limit.

DIDYMOCARPUS SUBALTERNANS, *Wall.* 7000–8000 ped. alt.
Common.

D. VILLOSA, *Wall.* 7000–9000 ped. alt.
Plentiful.

CHIRITA URTICÆFOLIA, *Wall.* 7000–9000 ped. alt.
Abundant.

C. MACROPHYLLA, *Wall.* 7000–8000 ped. alt.
Plentiful.

C. KURZII; *i. e.* Didymocarpus? Kurzii, *C. B. Clarke.* 9000 ped. alt.
In quantity. I figured this species from the single specimen in the Calcutta Herbarium (in fruit as figured), and marked as collected at Kursiong. This is a mistake. Mr. Kurz made an excursion to Tonglo; and, clearly, he got this specimen mixed with his Kursiong collections. I have now got complete specimens.

The corolla is large, very long, inflated from near the base; and I therefore think it must be put in *Chirita* (*vide* my remarks under *C. primulacea*, C. B. Clarke), The style at the top is shortly equally bifid, not unilateral, as heretofore insisted on for *Chirita*. The corolla is a beautiful yellow, with orange-brown spots in the throat, much resembling that of *Dichrotrichum Griffithii* in my figure, but longer. There are four stamens, as usual, in *Chirita*, and generally a prominent rudiment of the fifth. The stem is horizontal (slightly drooping) from trees or rocks; and the leaves (nearly always five in number) are all closely approximated at the very top of the stem, and lie nearly in the horizontal plane. The species is one of the most beautiful in this beautiful order.

ACANTHACEÆ.

THUNBERGIA LUTEA, *T. And.* 7000-9000 ped. alt.
Common.

T. COCCINEA, *Wall.* 7000-8000 ped. alt.
Abundant.

STROBILANTHES PECTINATUS, *T. And.* 7500 ped. alt.

S. WALLICHII, *Nees.* 8500-10,000 ped. alt.
Frequent.

S. DIVARICATUS, *T. And.* 7500 ped. alt.

S. ATTENUATUS, *Jacq.* 9000-10,000 ped. alt.

These four *Strobilanthes* I collected in flower. There is also at this level (7500-8500 ped. alt.) a dense mass of one of the large spreading shrubby species that only flower altogether after remaining several years without producing a single flower.

SCROPHULARIACEÆ.

SCROPHULARIA ELATIOR, *Wall.* 7500-8500 ped. alt.
Frequent.

S. URTICÆFOLIA, *Wall.* 9000 ped. alt.

MIMULUS NEPALENSIS, *Bth.* 7000-9000 ped. alt.
Plentiful.

MAZUS SURCULOSUS, *Don.* 7000-8000 ped. alt
Common.

M. DENTATUS, *Wallich.* Stolonibus nullis. Folia sinuata neque serrata. Flores subsessiles. 8000 ped. alt.

LINDENBERGIA URTICÆFOLIA, *Lehm.* 7000 ped. alt.

PEDICULARIS GRACILIS, *Wallich.* 8000 ped. alt.

UTRICULARIA ORBICULATA, *Wall.* 7000–8000 ped. alt.

Plentiful. Lower lip of corolla always with five shallow lobes and nearly white.

U. MULTICAULIS? *Oliver.* 8000–9000 ped. alt.

Plentiful. Lower lip of corolla 4-lobed, *i. e.* the middle lobe deeply divided; purplish, with a yellowish throat. Otherwise like the preceding species.

CAMPANULACEÆ.

CODONOPSIS INFLATA, *Hk. f. et Th.* 7000–8000 ped. alt.
Frequent.

CAMPANULA COLORATA, *Wall.* 7000–8000 ped. alt.
Common in open places.

PERNCARPA CARNOSA, *Hk. f. et Th.* 8000 ped. alt., in wet forest.

PIDDINGTONIA NUMMULARIA, *Lam.* From Darjeeling to 9000 ped. alt.
Abundant.

SPEIREMA MONTANUM, *Hk. f. et Th.* 8000 ped. alt.
Frequent.

LOBELIA WALLICHIANA, *Hk. f. et Th.* 8000 ped. alt.
Frequent.

VALERIANA, sp. 7000–10,000 ped. alt.
Abundant.

COMPOSITÆ.

DICHROCEPHALA LATIFOLIA, *Bth.* 7000–8000 ped. alt.
Common.

MYRIACTIS NEPALENSIS, *Less.* 7000–9000 ped. alt.
Common.

M. WALLICHII, *Less.* 8000–9000 ped. alt.
Common.

ANAPHALIS TRIPLINERVIS, *Bth.* 8000–10,000 ped. alt.
Common.

A. CINNAMOMEA, *Bth.* 7000–10,000 ped. alt.
Abundant.

Anaphalis tenella, *DC.*=Anaphalidis contortæ var. *mihi.* 7000–10,000 ped. alt.
Common.

A. adnata, *Wall.* 7000–8000 ped. alt.
Common.

A. araneosa, *DC.* 7000–10,000 ped. alt.
Common.

Gnaphalium confusum, *Wallich*=Gnaphalii luteo-albi, *L.*, var. *mihi.* 7000–10,000 ped. alt.
Common.

Carpesium cernuum, *L.* 7000–9000 ped. alt.
Common.

C. abrotanoides, *L.* 7500 ped. alt.
I have never seen this plant so far east before.

Bidens pilosa, *L.* 7000–8000 ped. alt.
Common.

Artemisia indica, *Willd.* 7000–9000 ped. alt.
Abundant.

Siegesbeckia orientalis, *L.* 7000–8000 ped. alt.
Frequent.

Gynura angulosa, *DC.* 7000–8500 ped. alt.
Plentiful.

Senecio Wallichii, *DC.* 8000 ped. alt.

S. alatus, *Wallich.* 8000–10,000 ped. alt.
Plentiful. Erect, sometimes 8 feet high.

S. tetranthus, *Wallich.* 8000–10,000 ped. alt.
Plentiful. Weak, semiscandent.

S. acuminatus, *Wall.* On Tonglo summit, 10,079 ped. alt.

S. (chrysanthemoides ? *DC.*). Tonglo, 10,000 ped. alt.

Saussurea (Aplotaxis) deltoidea, *Bth.* 7000–10,000 ped. alt.
Common in open places.

Ainsliæa pteropoda, *DC.* 7000–9000 ped. alt.
Abundant.

Prenanthes, sp. 8000–10,000 ped. alt.

ONAGRACEÆ.

EPILOBIUM ROSEUM, *L.* 7000–10,000 ped. alt.
Abundant.

MELASTOMACEÆ.

OSBECKIA CRINITA, *Bth.* 7000–9000 ped. alt.
Abundant.

SARCOPYRAMIS LANCEOLATA, *Wall.* 7000–9000 ped. alt.
Very common.

VACCINIACEÆ.

VACCINIUM.

Three or four species extend from Darjeeling to the top of Tonglo; but they are not now (Sept.) in flower, and I collected none.

RUBIACEÆ.

GALIUM (? HIRTIFLORUM, *Wall.*). 7000–8000 ped. alt.
Common.

GALIUM, sp. (fructibus glabris). 7000–8000 ped. alt.
Abundant.

RUBIA (CORDIFOLIA, *L.*?). 7000–9000 ped. alt.
Common.

LASIANTHUS (MEPHITIDA), sp. 7000 ped. alt.

OPHIORRHIZA (? RUGOSA, *Wallich*). 7000–8000 ped. alt.
Abundant.

OPHIORRHIZA, sp. Leaves and inflorescence, capsule, and corolla without nearly glabrous. Fruit, for the genus, large. Heads pink, short; peduncle drooping in bud and in full flower, erect in fruit. Stipules short, ovate, acute. Turns red in drying. Height 6–12 inches. Weak, suberect, subsimple. 8500 ped. alt.

Differing from all the ten or twelve Sikkim species known to me.

HYMENOPOGON PARASITICUS, *Wall.* 7000–9000 ped. alt.
Common.

CARLEMANNIA CONGESTA, *Hk. f. et Th.* 7000–7500 ped. alt.
Plentiful.

PENTAPYXIS STIPULATA, *Hk. f.* 7000–8000 ped. alt.
Plentiful. Now in fruit.

Dr. Hooker still retains this genus among Caprifoliaceæ in the 'Genera Plantarum.' I have always (that is, since I first saw the plant six years ago) supposed it Rubiaceous. The corolla is not more curved or one-sided than in many genera of Rubiaceæ, while the large stipules are very unlike Caprifoliaceæ. There is in truth no very definite line between the orders; but if *Pentapyxis* be put in Rubiaceæ we shall have a convenient (and better than at present defined) line, founded on stipulate and exstipulate.

CAPRIFOLIACEÆ.

LONICERA GLABRATA, *Wall.* 7500–8000 ped. alt.
Frequent.

LEYCESTERIA FORMOSA, *Wall.* 7000–8000 ped. alt.
Common.

VIBURNUM ERUBESCENS, *Wall.* 7000–10,000 ped. alt.
Abundant.

V. CORIACEUM, *Bl.* 7000–7500 ped. alt.
Frequent.

SAMBUCUS JAVANICA, *Reinw.* 7000–8000 ped. alt.
Very common.

S. ADNATA, *Wall.* 9000–10,000 ped. alt.

UMBELLIFERÆ.

HYDROCOTYLE (**NEPALENSIS**? *Hook.*). 7000–8000 ped. alt.
Abundant.

SANICULA EUROPÆA, *L.* 7000–9000 ped. alt.
Very common.

PIMPINELLA, sp. Leaves ovate acuminate; some (both at base and summit of stem) undivided, others tripartite. 9000–10,000 ped. alt.
Abundant.

SELINUM TENUIFOLIUM, *Wall.* 7000–8000 ped. ait.
Common.

HERACLEUM OBTUSIFOLIUM, *Wall.* 7000–10,000 ped. alt.

H. NEPALENSE, *Don.* 7000–9000 ped. alt.
Abundant.

PLEUROSPERMUM (**HYMENOLÆNA**), sp. 9000–10,000 ped. alt.

Perhaps *Ligusticum dentatum*, Wall.; but only in flower in September.

Dr. Hooker mentions Umbelliferæ as conspicuously absent from the upper part of Tonglo. His visit was in May; and in September I found Umbelliferæ very fairly represented in species and numerous in individuals.

ARALIACEÆ.

ARALIA, sp. At 9000 ped. alt. Scandent, large. Leaves simply pinnate; leaflets c. 7, serrate, glabrous. Umbels compound, umbellate.

PENTAPANAX, sp.? A tree 40 feet. Panicles very large and compound; glabrous, as are the leaves. Leaves simply pinnate; leaflets c. 7, entire. 7000–8000 ped. alt.

Frequent.

PENTAPANAX, sp.? Large, scandent, glabrous. Leaves simply pinnate, leaflets c. 7, sharply finely serrate. Panicles large, compound. 7500 ped. alt.

PANAX PSEUDO-GINSENG, *Wall.* 7000–8000 ped. alt.

Frequent.

PANAX? Tonglo top, 10,000 ped. alt.

Species herbaceous, near the last?

HELWINGIA HIMALAICA, *Hk. f. et Th.* 8000 ped. alt.

HEPTAPLEURUM TOMENTOSUM, *Ham.* 8000–9000 ped. alt.

Plentiful. More of a tree than most Araliads; often 50–60 feet high, with a clean trunk.

HEPTAPLEURUM, sp.? 8000–9000 ped. alt.

Like the last, but the leaflets very narrow and dentate-serrate. Frequent.

BRASSAIOPSIS, sp. Erect, with 1–3 erect branches, 15–20 feet high. 7000–8000 ped. alt.

Common.

Besides the above, I collected leaves or imperfect specimens of eight other Araliads between Darjeeling and Tonglo top. They are well known to be characteristic of this level; but as I have neither Seemann's papers nor my own herbarium to compare them with, I think it more prudent to make no guesses from memory about them.

HAMAMELIDEÆ.

BUCKLANDIA POPULNEA, *Bth. & Hk.* 7000–8000 ped. alt.
Frequent about Darjeeling.

LORANTHACEÆ.

I collected none.

FILICES.

(Named as in Baker where not otherwise stated.)

GLEICHENIA LONGISSIMA. 7000–8000 ped. alt.
Common.

ALSOPHILA LATEBROSA. 7000 ped. alt. exactly, and not higher.

DIACALPE ASPIDIOIDES. 8000–9000 ped. alt.
Plentiful.

SPHÆROPTERIS BARBATA. 7500–8500 ped. alt.
Common.

DICKSONIA SCABRA. 7000–8000 ped. alt.
Very common.

HYMENOPHYLLUM EXSERTUM. 7000–9000 ped. alt.
Abundant.

H. POLYANTHOS. 7000–8000 ped. alt.
Common.

H. SIMONSIANUM. 8000–9000 ped. alt.
Plentiful.

DAVALLIA PTEROPUS, *Bedd.* 7000–8000 ped. alt.
Frequent.

D. HOOKERI, *Moore.* 7000–8000 ped. alt.
Perhaps *D. pulchra*, Baker. Frequent.

D. PULCHRA, *Don* (Davallia chærophylla, *Baker*). 7000–8000 ped. alt.
Very common.

D. NODOSA. 7000–9000 ped. alt.
Abundant.

CYSTOPTERIS SETOSA, *Beddome.* 7000–9000 ped. alt.
Very common.

LINDSAYA CULTRATA. 7000–8000 ped. alt.
Common.

PTERIS CRETICA. 7000–8000 ped. alt.
Rare (*i. e.*, so high).

P. QUADRIAURITA. 7000–8000 ped. alt.
Plentiful.

P. AQUILINA. 7000–8000 ped. alt.
Common.

P. WALLICHIANA. 7000–9000 ped. alt.
Abundant.

LOMARIA PYCNOPHYLLA. 7500–9000 ped. alt.
Abundant.

WOODWARDIA RADICANS. 7500–8500 ped. alt.
Scare.

ASPLENIUM TINGENS, *Don.* 7000–10,000 ped. alt.
Abundant. The typical *A. ensiforme* of Ceylon is broader, thinner in texture, and does not in drying stain the paper a madder-rose, which the Himalayan *A. tingens* does.

A. NORMALE. 7000–8000 ped. alt.
Frequent.

A. RESECTUM. 7000–8000 ped. alt.
Not common. Above 7000 feet this fern is hardly seen except very small, delicate in texture, and hanging from wet rocks, the var. *udum* of W. S. Atkinson.

A. HETEROCARPUM. 7000 ped. alt., and not higher.

A. PLANICAULE. 7000–8000 ped. alt.
Scarce.

A. LACINIATUM. 7000–8000 ped. alt.
Scarce. These last five ferns abound at somewhat lower levels.

A. TENUIFOLIUM. 7000–8000 ped. alt.
Frequent.

A. MACROCARPUM. 7000–10,000 ped. alt.
Abundant. The most prevailing fern at 7000–8000 feet, with endless variety in form and cutting. The type, α, is bipinnate; there is also var. β, once pinnate and the frond much narrower; and also (which may be a species) γ. *Atkinsoni*—frond linear,

oblong, once pinnate, the involucres large and conspicuously fimbriate. This fimbriate-involucred plant never grows large.

ASPLENIUM NIGRIPES. 7000–10,000 ped. alt.

Abundant; only less so than the last species. In its typical form this is a rigid, hard fern; but it varies by degrees into a high-level small fern with a succulent stipe.

A. ANDERSONI. Stipe red, scaly; frond reddish when fresh, with a prominent gland at the base of each pinna. This varies: *α*. 2-pinnate, 3-pinnatifid, frond oblong; *β*. 3-pinnate, frond broad oblong; *γ*. 4–5-pinnate, frond very large, primary pinnæ very broad ovate, sori numerous large. 9000–10,000 ped. alt.

Abundant. Has been distributed by me under this name.

Mr. Baker tells us that all these forms are varieties of *Filix-Fœmina* for him; by which I understand that the tolerably definite forms, as *nigripes*, are separated off in the 'Species Filicum,' and all the rest left in an undigested mass as *F.-Fœmina*; and I do not say that I am able at present to suggest any other course as practicable.

A. UMBROSUM, *J. Smith*? 7000–8000 ped. alt.

(Nec *A. umbrosum* in Baker, which is *Athyrium australe*, Brack., true.) Very common.

This fern has long had the name *A. umbrosum*, J. Smith, at Calcutta; nor do I know any better name for it; but it is totally different from the fern described in Baker, which is *Athyrium australe*, as sent us from Ceylon by Mr. Thwaites.

The present fern has a tufted rootstock and very large fronds, with the aspect of the compound Diplaziums. The stipe is rough ("asperous"), and the texture light green. The sori are white, small, and placed parallel to the rachis of the pinnule and close to it. The indusium never opens from the side (as in the true Diplaziums), but in the living plant (as well as in dried plants for the herbarium) breaks up at the back, as in true *Allantodia*. The sori, too, are never truly diplazioid, *i. e.* back to back.

A. SORZOGONENSE. 7000–10,000 ped. alt.

Abundant.

A. POLYPODIOIDES. 7000–7500 ped. alt.

Common. Rootstock always tufted, and often in old plants rising 1–1½ foot from the ground, and called by English visitors a tree fern. There are two forms here—*a* with very shaggy rachides, β with glabrous rachides; but they pass into one another. On the other hand, the rachides are here never asperous; and *D. asperum*, Beddome (the Nilgherry plant), seems to me good.

D. Griffithii (mihi) differs by the creeping rootstock sending up solitary fronds.

Asplenium, sp. (27,454). 7000 ped. alt.

A creeping rooted species, sending up distant very large fronds of succulent texture, 3-pinnate, 4-pinnatifid, glabrous. Veins in the final (4th) pinnule pinnated; sori long. Margin of the tertiary pinnule sinuate-crenate, not incised.

I do not propose to make a new species for this plant; but I have no idea to what described species to refer it.

A. dilatatum, *Wall.* 7000–9000 ped. alt.

Common.

Allantodia brunoniana. 7000 ped. alt., and not higher.

Aspidium auriculatum. 7000–9000 ped. alt.

Frequent. There are two forms of this, viz. β. *ocellatum*, little divided with large sori, and γ. *subbipinnatum* with small sori.

A. aculeatum. 7000–10,000 ped. alt.

Common. There are several forms of this:—

- α. Rachis upwards, with no ovate scales. Secondary pinnæ stalked.
- β. Semifertile. Upper third part of the frond barren, lower two thirds covered with sori.
- γ. *rufobarbatum.* Densely shaggy with yellow-brown scales.

A. aristatum. 7000 ped. alt., and not higher.

A. fœniculaceum. 8000–10,000 ped. alt.

Frequent.

A. caducum. 7000 ped. alt., and not higher.

Nephrodium hirtipes. 7000 ped. alt., and not higher.

N. gracilescens? 8000 ped. alt.

N. prolixum. 7000 ped. alt.

Abundant. The large Sikkim *prolixum* is often 6 feet high, and very different from the typical *prolixum* sent from Ceylon by Mr. Thwaites.

N. apiciflorum, 8000–10,000 ped. alt.

Very plentiful. Gets smaller above 9000 feet, but does not alter its character or run into the next.

NEPHRODIUM NIDUS. 9000–10,000 ped. alt.

Most abundant at 9000–11,000 ped. alt. throughout Sikkim. Distributed by me five years ago as *Lastrea Nidus.*

I sent this fern to (among other persons) Mr. Baker, who thought it near *L. patentissima,* Wallich, and, like it, a variety of *L. Filix-Mas.* Mr. Thwaites, on the contrary, thought the fern so very near *L. apiciflora,* that it might be made a variety of it; and in this view Capt. Henderson and W. S. Atkinson concur. I will therefore, describe it more particularly in comparison with *L. apiciflora.*

Rootstock tufted, the fronds (6–12) rising in a perfect circle round it, as in *Asplenium Nidus.* Fronds 1–2½ feet long, very narrow, lanceolate. Pinnæ close, approximate, the lower ones deflexed, and the lower pinnæ gradually reduced to the very base of the stipe. Rachis with very long linear dark-brown scales. Sori not in the least apicifloral. Pinnules truncated at top, with a very narrow scarious margin.

My own opinion is that this fern is most nearly allied to *L. apiciflora,* and that it is as good a species as *apiciflora* itself.

N. FILIX-MAS.

α. Bipinnate, not tripinnate. Sori not large. 7000–8000 ped. alt.

Rare. The common English form.

β. MADERENSIS. Not dimorphous. Stipe grooved above. A mass of soft yellow scales at base of stipe. Sori very large. 7000–10,000 ped. alt.

Abundant. A fern very different from *Lastrea cochleata* (except to the large sori); but unfortunately Wallich distributed some *maderensis* marked *cochleata* in his own hand; for I have seen it.

γ. ELONGATA. Frond broad, tripinnate. Lower pinnæ not auricled. 7000–8000 ped. alt.

Not common. This form comes too close to *L. sparsa.*

N. PATENTISSIMUM, *Wallich,* sub *Lastrea* (a var. of *Filix-Mas,* for Baker). 7000–9000 ped. alt.

Common. A magnificent fern, with narrow oblong fronds nearly 6 feet long; rachis densely scaly. So far as I can judge, it is better separated specifically from *L. Filix-Mas* than are *L. sparsa* and several other admitted species.

N. fusiforme, W. S. Atkinson, is related to this exactly as my

N. Nidus is to *N. apiciflorum*, but is not found on Tonglo; it comes in at about 11,000 feet.

NEPHRODIUM FLACCIDUM. 7000-8000 ped. alt.
Frequent.

N. SPLENDENS. 7500-8500 ped. alt.
Plentiful.

N. PULVINULIFERUM, *Bedd.* 7500-8500 ped. alt.
Frequent.

N. BORYANUM. 7000-8000 ped. alt.
Common.

β. MICROSTEGIOIDES. Ultimate segments close, subentire; often no wing to the rachis. Grows with the other, more lax, more finely cut form.

OLEANDRA WALLICHII. 7000-8000 ped. alt.
Plentiful.

POLYPODIUM AURICULATUM. 7000-8000 ped. alt.
Abundant.

P. DISTANS. 7000 ped. alt.
Frequent.

P. SUBFALCATUM. 7500-9000 ped. alt.
Scarce.

P. SUBDIGITATUM. 7000-9000 ped. alt.
Common.

P. AMŒNUM. 7000-10,000 ped. alt.
Abundant.

P. LACHNOPUS. Rhizoma thick, with spreading long scales. Rachis of the frond on the upper face always puberulous. 7000 ped. alt.

Rare (abundant at lower levels).

P. MICRORHIZOMA, *C. B. Clarke.* Rhizoma thin, with no long spreading scales. Rachis of the frond on the upper face perfectly glabrous. 7000 10,000 ped. alt.

Abundant.

P. SUBAURICULATUM. 7000-10,000 ped. alt.
Abundant.

P. LINEARE. 7000-10,000 ped. alt.
Abundant.

Polypodium lineare, var. β. **stenophyllum.** Frond very narrow; the sori large, appearing as knobs on the edge. 10,000 ped. alt.

P. superficiale. 8000 ped. alt.

P. normale. 7000–8000 ped. alt.
Common.

P. Griffithianum. 7000–10,000 ped. alt.
Very common.

P. membranaceum. 7000 ped. alt.
Frequent.

P. trifidum. 7000 ped. alt.
Frequent.

P. malacodon. Abundant above 9000 ped. alt.

P. Stewartii, *Bedd.* Plentiful at 8000 ped. alt.
I think, quite distinct from *malacodon.* The edge is obscurely serrate (not finely ciliate-serrate as in *malacodon*), the lowest pair of pinnæ ascend with a curve tapering (not spread subdeflexed, as in *malacodon*); at the base of the rachis on the under side is a grey fluff (never seen in *malacodon*); the rhizoma is stouter, with long, spreading, finely aristate scales.

P. ebenipes. 7000–10,000 ped. alt.
Very common.

β. **Oakesii.** Pinnæ very numerous, linear, oblong (not at all triangular). Rachis on upper side of frond very pilose, puberulous. In Darjeeling at 7500 ped. alt.

P. juglandifolium. 7000–9000 ped. alt.
Abundant.

P. Lehmanni. 7000–8500 ped. alt.
Plentiful.

P. himalayense. 8000–9000 ped. alt.
Plentiful.

P. leiorhizon. 7000–8000 ped. alt.
Scarce.

Gymnogramme aurita. 7000–8000 ped. alt.
Common.

G. opaca. 7000–8000 ped. alt.
Frequent.

GYMNOGRAMME JAVANICA. 7000–8000 ped. alt.
Common. The high-level form is generally bipinnate. There is also at this level a var. γ. *pilosa*, with the surface of the frond beneath pilose.

G. MICROPHYLLA. 8000–9000 ped. alt. on Tonglo.
N.B. I did not collect this on the present excursion.

VITTARIA LINEATA. 7000–10,000 ped. alt.
Common.

ANGIOPTERIS EVECTA. 7000–8000 ped. alt.
Common. The high-level form of this fern is the large one.

BOTRYCHIUM VIRGINIANUM. 7000–7500 ped. alt.
Frequent.

LYCOPODIUM CLAVATUM, *L.* 7000–9000 ped. alt.
Very common.

On a new Genus of Turneraceæ from Rodriguez.

By ISAAC BAYLEY BALFOUR, D. Sc., F.L.S.

[Read March 2, 1876.]

MATHURINA, gen. nov.

Sepala 5, elliptico-oblonga, acuminata, costa prominente, glandula magna bilobata intus basi adnata. *Petala* 5, subhypogyna, obcuneata, acuta, nuda, basi sepalis leviter adnata, reclinata et corrugata. *Stamina* 5, subhypogyna, exserta, filamentis subulatis calycis glandulis in fundo imo vix adhærentibus. *Antheræ* lineari-oblongæ, introrsæ. *Ovarium* sessile, liberum, oblongum, glabrum; ovula adscendentia; styli 3, filiformes, terminales, stigmatibus dilatatis subfimbriatis. *Capsula* oblonga, glabra, 3-valvis, ∞-sperma. *Semina* obovoideo-cylindracea, lente curva, funiculo brevi, arillo longe piloso-sericeo basim seminis circumdante, testa crustacea extus foveolata, albumine carnoso; embryo axilis, rectus, cotyledonibus ovatis plano-convexis, radicula tereti.

Arbor parva. Folia alterna, petiolata, lanceolata, sæpe obovata, acuta crenato-serrata; petiolus 2-glandulosus; stipulæ glanduliformes, deciduæ. Flores magni, pedunculati, vulgo solitarii, axillares, nonnunquam in cymas trifloras dispositi, albi; pedunculi infra medium articulati, 2-bracteolati; bracteolæ subfoliaceæ, serratæ v. crenatæ.

MATHURINA PENDULIFLORA (species unica).

Arbor parva usque ad 20 pedes alta, ramis erectis, foliorum cicatricibus magnis. Folia lanceolata v. obcuneata acuta, sed per adolescentiam linearia, petiolo brevi margine utroque versus medium glandula instructo, lamina decurrente. Flores albidi. Glandulæ sepalorum intus sulcatæ pubescentes, apice emarginatæ. Ovarium glabrum, stylis incurvatis.

This tree, a native of the island of Rodriguez, in the Indian Ocean, is known to the inhabitants as the Bois Gandine. It is small and handsome, never attaining any great height, with a very erect habit and the terminal branchlets thickly clothed with light-green foliage. The foliage is peculiarly heterophyllous—a character remarkable in most of the trees endemic in the island. The adult leaves are more or less obcuneate and elongated, with a rounded and acute apex, and the margins crenate; but on young plants, and on adventitious shoots of old trees, the leaves are linear and widely serrate; and betwixt those extremes a series of transitional forms may be obtained. The tree flowers in December, very profusely, the flowers being of a greenish-white hue.

The stem has a rough, light-coloured bark, and is usually thickly clad with lichens. The wood is light-coloured, and fine-grained; but as the tree does not grow to any size, it is not much used by the inhabitants. The tree grows almost always on the higher parts of the island; only in two localities have I found a specimen on the lower ground or near the sea. It belongs to the family Turneraceæ, the nearest affinity being with the monotypic genus *Erblichia* of Seemann, a native of Panama.

In the family Turneraceæ, as constituted in Bentham and Hooker's 'Genera Plantarum' (vol. i. p. 806), three genera are described—*Turnera*, *Erblichia*, and *Wormskioldia*. Of these, *Turnera*, embracing about 70 species, is confined to America, save one Cape species; *Erblichia*, endemic on the Isthmus of Panama, is monotypic; and *Wormskioldia*, including four species, is an African genus. Of these genera none are indigenous in the Mascarene islands. *Turnera angustifolia*, DC., is mentioned by Bojer (Hort. Maur. p. 152) as growing wild in many parts of Mauritius; and a species of the same genus is also found introduced in Bourbon. Hitherto no plant of this family has been described as indigenous in these islands; and this lends additional interest to the discovery of the plant now before us.

The characters which separate *Mathurina* from *Turnera* and *Wormskioldia* are so numerous and so evident that I need not dwell upon them; but its relationship to *Erblichia* is so close that an indication of the characters on which its generic separation depends seems advisable. In habit and mode of leafing the plants are almost identical; but the stipules in *Erblichia* are marcescent, whilst in *Mathurina* they are very early deciduous. In the sepals of *Mathurina* is found one of its most important generic characters: each sepal is clothed at the base on the inner aspect with a large bilobed emarginate gland, about one sixth of the length of the sepal; and from its apex there runs a prominent broad nerve to the extremity of the sepal. This structure is unrepresented in *Erblichia.* Coming now to the corolla, we find the petaline fringes of *Erblichia* absent in *Mathurina*; nor is there such a distinct claw to each petal. The stigmas of *Erblichia* are described in the 'Genera Plantarum' as dilated and entire; but those of *Mathurina* are distinctly though minutely fimbriate, and in the dried specimen the fringe is folded inwards into the club-shaped dilated extremity of the style. Seemann (Bot. Her. 130, t. 27), in his description, says the stigmas of *Erblichia* are fimbriate. I cannot say from observation whether they are so or not. From the seeds we might expect to make an important diagnosis; but whilst the slightly curved foveolate seeds of *Mathurina*, with an aril of membranous filaments extending upwards around it from a ring encircling the hilum, are very characteristic, the seeds of *Erblichia* are unfortunately very imperfectly known: in fact we only know that they are straight; and in this particular they differ from those of *Mathurina.*

Although, then, our knowledge of the genus *Erblichia* is not complete, I think the characters in which we can compare it with the Rodriguez plant, especially those in the floral envelopes, are, in this family, sufficient to warrant us in taking the Rodriguez plant as the type of a new genus; at least it seems to me more rational to do so than to mutilate the description of an old genus to embrace a new species upon imperfect data. I have therefore constituted the Rodriguez plant a new genus *Mathurina*, adopting for it that of the town, Port Mathurin, in Rodriguez.

It is hardly within my province here to describe the relationships of the family Turneraceæ; but a glance at them as affected by the discovery of *Mathurina* may be not uninteresting.

Turneraceæ are always regarded as very closely allied to Passifloraceæ, their main distinction being the absence of the corona. Seemann, indeed, considering the petaline fringes in *Erblichia* the homologue of a corona, united the families; but this (as pointed out by Bentham and Hooker) is a mistake, and the fringes of *Erblichia* point rather in the direction of Pangiæ, a tribe of Bixineæ; and their habit, fugacious petals with no corona, sufficiently distinguishes Turneraceæ from Passifloraceæ. *Mathurina* does not in any way affect the relationship of the families; for I apprehend the glands on the sepals have no homology with the corona in Passifloraceæ.

With Bixineæ a much closer affinity exists, as also indicated by Bentham and Hooker; and in fact *Erblichia* and *Mathurina* so completely unite the families that I fail to find any point of absolute distinction. I am therefore inclined to agree with Baillon (Hist. des Plantes, vol. iv. p. 293), who makes Turneraceæ a tribe of Bixineæ, or at least to relegate the family to the vicinity of Bixineæ rather than of Passifloraceæ. *Mathurina* also establishes a very important connexion between Turneraceæ and Samydaceæ, the connexion bearing upon geographical distribution. Samydaceæ are a link between Passifloraceæ and Bixineæ—from the former differing in the absence of a corona, and from the latter in the perigyny of the stamens. But the relationship with the latter is so close that they are frequently united as one family. With Samydaceæ, then, *Mathurina* connects Turneraceæ in many particulars; and specially would I notice that in the tribe Homalieæ we find the type of those glands (calycine) which are so characteristic a feature in *Mathurina*; and, further, one species of *Homalium* is Mauritian, and two genera, *Calantica* and *Bivinia*, in which the glands are well developed, are endemic in Madagascar. This close affinity of *Mathurina* with Mascarene types, and the relationships it establishes betwixt Turneraceæ and families in which such types are found, seem to me to render less surprising its occurrence in these islands—a new genus of a family hitherto unknown in these islands, and with its nearest affinity a monotypic Central-American genus.

Note on *Boëa Commersonii*, R. Br.

By HENRY TRIMEN, M.B., F.L.S.

[Read Feb. 3, 1875.]

THIS plant, the type of the genus*, was discovered by Commerson, and originally named by Lamarck† *B. magellanica,* under the idea that it was collected in Magellan Straits, where Commerson spent some time when naturalist to Bougainville's voyage. It is figured from his specimens in Lamarck's 'Illustrations'‡.

R. Brown, in 1838§, in his revision of *Cyrtandraceæ*, having obtained authentic specimens, found their locality to be "isles Praslins;" and he accordingly altered the erroneous specific name to that which is now used. The precise locality on one of the labels attached to the specimens (now in the British Museum) is "in rupibus sylvosis portum Prasliniæ coronantibus, Julio, 1766" (in Brown's hand, but no doubt copied from the original). Praslin being the name of one largest of the Seychelles, all subsequent writers on the plant have given it as a native of that group, where, however, no collector has since met with it. Brown placed three other species in the same genus, the *Dorcoceras* of Bunge from North China, and (doubtfully) two Indian plants‖. No addition is made to this in De Candolle's 'Prodromus' (1845)¶; but since then four or five more species have been described, natives of India, Celebes, and one from N.E. Australia.

Quite lately Baron von Mueller, of Melbourne, was so good as to send me one of the three specimens of a *Boëa* collected on coral cliffs in the Duke-of-York's Island, a miniature Isle of Man, lying in St. George's Channel, between New Britain and New Ireland. This was gathered by Mr. C. Walter, who, under the auspices of the young Baron von Huegel, visited the islet in the Wesleyan Mission-ship. Dr. von Mueller requested me to compare the specimen with Commerson's plant, with which he was inclined to put it, in spite of some discrepancies (which will be immediately alluded to) between it and the published description, to which alone he had access. There can be little hesitation in confirming his opinion, Mr. Walter's plant differing only in its smaller and thicker leaves, much more densely silvery hairy, and with the veins somewhat broader and more prominent beneath.

---

* Named by Commerson in honour of his brother-in-law, the Rev. Dr. Beau, of Toulon.

† Dict. i. p. 401. ‡ Illust. i. p. 53, t. 15. § Pl. Javan. Rar. p. 120.

‖ *B.? Wallichii* and *B.? multiflora* The latter is not the same (as has been thought) as the *Championia multiflora* of C. B. Clarke, Cyrtand. Bengal. t. 68.

¶ DC. Prod. ix. p. 271.

It thus appeared that we had here a striking example of a plant found, as far as yet known, only on two small islands separated by one third of the circumference of the globe, though lying in almost the same parallel of latitude (about 4° S.). A little examination, however, shows that we have been in error in considering the plant a native of the Seychelles, and that in all probability the spot where Commerson found it was in fact very near that in which it has been just collected.

Bougainville's ship 'La Boudeuse' arrived at the island of New Ireland in July 1768, and, anchoring in St. George's Channel at Port Carteret (so named from the discoverer of the island in the previous year), stayed there in all eighteen days. On July 13th they visited a small bay close to the south-west corner of the island, and there observed the longitude, and witnessed an eclipse of the sun. This little bay, protected by a small islet (I. aux Marteaux, now Wallis I.), was named by the expedition Port Praslin*, an appellation which it still retains. There is every probability that this is the "Portus PraslinIæ" of Commerson, where his *Boëa* was discovered†, and that now after the lapse of more than a century the little plant has been again found within a few miles of this spot‡.

In Brown's published definition of the genus the corolla is described as "bilabiata, tubo calycem vix æquante;" and this is repeated in the 'Prodromus.' Baron v. Mueller was on this account doubtful whether the plant from the Duke-of-York's Island could be certainly the same, as in it the corolla is divided nearly to the base into two lips, without any tube, the lower lip being quadrate cuneate, with three short blunt teeth, and not deeply three-lobed. Why Brown should have given the above character to the corolla in his published account is not obvious;

---

* 'Voyage autour du Monde,' (Paris, 1771) pp. 273-279 and pl. 14.

† There is yet another Port Praslin, on the N.E. coast of Santa Isabella island, one of the Solomon archipelago, lying to the S.W. of the New Ireland group. This bay contains numerous wooded islets.

‡ The years do not correspond; but, in copying, "Julio 1768" may readily have become altered into "Julio 1766." Indeed the latter cannot be correct, as the expedition did not start till the following year.

for in his MS. description attached to the specimen it is thus characterized:—"Corollæ labium alterum latum suborbiculatum obscure trilobum, alterum 2-partitum deorsum flexum segmento quolibet ambitu subrotundo adeo ut corolla primo aspectu 3-petala videri possit," a description which agrees with Mr. Walter's plant as well as with Commerson's type, and which is, indeed, very well shown in the rough original figure in Lamarck's Dictionary.

LICHENES CAPENSES:—An Enumeration of the Lichens collected at the Cape of Good Hope by the Rev. A. E. EATON during the Venus-Transit Expedition in 1874. By the Rev. JAMES M. CROMBIE, F.L.S. &c.

[Read February 3, 1876.]

ALTHOUGH various species of Cape Lichens were enumerated by Acharius and Thunberg, as also by Flotow, and more especially by Dr. Nylander in his Enum. Gen. and Synopsis, yet the first (and hitherto the only) separate list of such published is that of Massalongo, who, in 'Mem. dell' I. R. Ist. Venet. di Sc.' &c., x. 1861, pp. 33–82, records and describes those collected by Dr. Wawra, Surgeon of the corvette 'Carolina,' in 1857–58. These amount in all to 48 species, with a fair proportion of varieties, of which 23 species are described as new, though some deductions must be made from this. In the Appendix, pp. 83–90, he also enumerates 19 other species, which had been met with by previous collectors, such as Ecklon, Breutel, Drège, Zeyher, &c., several of which, however, are also to be deleted. The Cape Lichens thus recorded by Massolongo seem to have been collected in a different part or parts of the Colony from those which form the subject of the present memoir, so that little or no comparison can be instituted between them, only some 12 species being common to the two lists. The only locality examined by Mr. Eaton during the short stay of the Venus-Transit Expedition at the Cape, on its way to Kerguelen's Land, was Table Mountain, to which, however, he was able to make only a very few excursions. Unfortunately that to the summit was interrupted by mist; so that but few specimens were there gathered, though it would have been interesting to know what phyto-geographical types occur at that altitude in this region. In the determination of the valuable collection of Lichens thus made I have been kindly assisted by Dr. Nylander, to whom I am indebted for the following diagnoses of the new species amongst them. Most of these I have recently briefly recorded in the 'Journal of Botany,' v. pp. 18–21.

Family BYSSACEI.

SIROSIPHON ——? Infertile, and otherwise with thallus probably not fully developed. Indeterminable.

Family COLLEMACEI.

COLLEMA PULPOSUM, var. TENAX, *Ach.*
On the bare ground, very sparingly.

LEPTOGIUM TREMELLOIDES (*L.*), *Ach.*
Amongst mosses on rocks; fertile.

L. (STEPHANOPHORON) PHYLLOCARPUM (*Pers.*)
On the trunks of trees; barren.

Family LICHENACEI.

Tribe CLADONIEI.

CLADONIA FIMBRIATA, *Hffm.*
On the ground, sparingly, but fertile.

F. SUBCORNUTA, *Nyl.*
On the ground with the type, but barren.

C. FURCATA, *Hffm.*
Amongst mosses on the ground; small and infertile.

CLADIA AGGREGATA (*Sw.*).
On the ground; young and sterile.

Tribe SIPHULEI.

SIPHULA TABULARIS (*Thunb.*).
On the ground near the summit; very sparingly gathered.

Tribe USNEEI.

USNEA FLORIDA, *Ach.*
On rocks; infertile.

The specimens are more or less readily referable to the state called *rubiginea* (Mich.), whence *U. rubiginea*, Mass. Lich. Cap. p. 45, t. viii. f. 23–26, ut propria species!

U. LONGISSIMA, *Ach.*
On trees; infertile, and not very typical fragmentary specimens.

Tribe Ramalinei.

Ramalina Yemensis (*Ach.*).
On the trunks of trees; fertile.

R. cuspidata (*Ach.*).
On rocks; apparently common and fertile.

Tribe Parmeliei.

Sticta crocata (*L.*).
On mossy roots of trees; barren.

S. gilva (*Thunb.*).
On trunks of trees, sparingly; fertile.

S. quercizans (*Ach.*).
On mossy rocks; small and infertile.

S. pulmonaria, var. hypomela, *Del.*
On trunks of trees; apparently common, but scarcely fertile.

S. aurata, *Ach.*
Amongst mosses on rocks; barren.

Parmelia perforata, *Ach.*
On trees; infertile or scarcely fertile.

On one specimen a single apothecium is present, but without spores, and no spermogones are visible.

P. atrichoides, *Nyl.*, sp. n. Subsimilis *P. atrichæ*, Nyl. Obs. L. Pyr. Or. p. 17, sed sporibus minoribus (longit. 0·008–0·011 millim., crassit. 0·004–0·006 millim.). Spermatia subbifusiformia, longit. 0·005–0·006 millim., crassit. 0·0006 millim.
On rocks; apparently not unfrequent.

P. molybdiza, *Nyl.*, sp. n. Affinis *P. atrichoidi* (etiam reactione CaCl $\mp$ conveniens), sed thallo minore facile plumbeo tincto et magis adnato atque apotheciis lecanorinis. Sporæ longit. 0·009–0·011 millim., crassit. 0·006 millim. Spermatia bifusiformia, longit. 0·006–0·007 millim., crassit. 0·0005 millim.
On rocks; very sparingly gathered.

P. subæquans, *Nyl.* Sat similis *P. Borreri*, et forsan solum varietas, differens apotheciis, receptaculo firmiore nec soredioso-dissoluto. Apothecia juniora margine receptaculari radiatim sphinctrino-striato. Sporæ longit. 0·014–0·015 millim., crassit. 0·009–0·011. Iodo gelatina hymenialis cærulescens,thecæ præsertim tinctæ et deinde violascentes.
On the trunks of trees, amongst mosses.

P. conspersa (*Ehrh.*).
Amongst mosses on rocks; sufficiently similar to the European lichen. A state also occurs having the thallus internally sub-rose-coloured.

Var. *hypoclysta*, Nyl., with the receptacular margin sometimes subcrenulated. On mossy rocks; sparingly gathered.

PARMELIA CONSTRICTANS, *Nyl.* Sit *P. conspersæ* subspecies, minor, stenophylla, laciniis hinc inde constrictiusculis, h. e. attenuatis.

On the ground towards the summit, apparently amongst detritus.

Var. *eradicata*, Nyl. Satis insignis, minor, tenuior, laciniis ascendentibus, etiam subtus glabris (rhizinis rarissimis vel obsoletis).

On the summit amongst mosses.

P. SUBCONSPERSA, *Nyl. in Flora*, 1869, p. 293.

On rocks; sparingly gathered.

P. ENDOMILTODES, *Nyl.*, sp. n. Subsimilis *P. conspersæ* minori, sed thallo medulla insigniter cinnabarina (K+, violascente). Apothecia spadicea margine receptaculari subcrenato. Sporæ longit. 0·008–0·010 millim., crassit. circiter 0·006 millim. Spermatia subbifusiformia, longit. circiter 0·006 millim., crassit. 0·0006–0·0007 millim.

On rocks.

P. CONSPERSULA, *Nyl.*, sp. n. Quasi *P. conspersa* parva, thallo adnato, centro areolato-diffracto (vel subgranulato-areolato, nam areolæ subconvexulæ). Apothecia lecanorina (latit. 1·5 millim. vel minora), margine thallino tenui integro. Sporæ longit. 0·007–0·008 millim., crassit. 0·006 millim. Spermatia subbifusiformia, longit. 0·005–0·006 millim., crassit. 0·0006–0·0007 millim.

On rocks associated with other lichens, sparingly, and rarely fertile.

P. ADHÆRENS, *Nyl.*, sp. n. Thallus stramineus, medio sordide lutescens, crustaceo-adnatus, areolato-diffractus, areolis convexiusculus (crassit. vel altit. circiter 0·5 millim.), ambitu effiguratus et sublaciniato-divisus, divisionibus planiusculis, contiguis subcrenatis; apothecia spadiceo-fusca lecanorina (latit. 0·5–0·7 millim.), margine thallino integro cincta. Sporæ ellipsoideæ, longit. 0·009–0·011 millim., crassit. 0·005–0·007 millim.; paraphyses non distinctæ. Iodo gelatina hymenialis cærulescens, dein sordide lutescens.

Species prope *P. Mougeotii* disponenda. Laciniæ thalli margine summo nigricante. Medulla K +, flavens. Spermatia tenuiter fusiformia, longit. circiter 0·007 millim., crassit. vix 0·0005 millim. excedentia.

At first sight this species is sufficiently similar to *Squamaria saxicola* diffracta*, Ach., but is a true *Parmelia* (as is at once evident from the spermogones).

On rocks (quartzose); sparingly gathered and very rarely fertile.

P. SQUAMARIATA, *Nyl.*, sp. n. Thallus olivaceus vel castaneo-olivaceus, adpressus, adnatus, indistincte radioso-divisus (ambitu dilutior), nitidiusculus, crenato-incisus, laciniis ibi distinctioribus sed contiguis et subconfluentibus (K medulla e flavo cinnabarine tincta); apothecia spadicea minuta lecanorina (bene evoluta non visa). Sporæ ellipsoideæ, longit. 0·008–0·011 millim., crassit. 0·0035–0·0040 millim. Spermatia acute fusiformia, longit. 0·005–0·007 millim., crassit. 0·0006–0·0007 millim.

In thalli divisionibus rimæ (fissuræ) frequenter obveniunt transversæ vel obliquæ. Variat thallus cinerascens et centro leviter fuliginosus (subfurfurellus),—f. *cinerascens.*

This species belongs to the section of *P. adhærens.* It presents somewhat the appearance of *Squamaria saxicola*, f. *Garovaglii* (Krb.); but the colour is different, as also the analytical characters. The spermogones show that it is a *Parmelia*, having arthrosterigmata with somewhat long thin articulations as in the *Parmeliei.* With reference to the specific name, Nylander observes, " Nomen *squamariata* est formatum ut *sulphuratum, sulphuraria.*"

On rocks; very sparingly gathered.

PARMELIA MOLLIUSCULA, *Ach.*

On rocks; fertile. A state with more elongated and narrower laciniæ also occurs, but with the apothecia not rightly developed. In the fertile specimens the spores are about 0·008 millim. long, 0·005 millim. thick. The spermatia are bifusiform, 0·006–0·007 long, 0·0007 millim. thick.

P. PROLIXULA, *Nyl.*, sp. n. Thallus olivaceus vel olivaceo-fuscescens, stellato-laciniatus (laciniis latit. circiter 0·5 millim., confertis), adpresso-adnatus (K∓, medulla e flavo rubricose tincta); apothecia spadiceo-fusca (latit. 1 millim. vel minora), sublecanorina, margine receptaculari subintegro. Sporæ oblongæ, longit. 0·009–0·015 millim., crassit. 0·0035–0·0045 millim.; paraphyses non discretæ; epithecium fuscescens. Iodo gelatina hymenialis cærulescens, dein subincolor et thecæ sordide violascentes. Spermatia aciculari-fusiformia (vix vel obsolete observanda medio subtenuiora), longit. 0·005–·006 millim., crassit. 0·0006 millim.

This species approaches *P. Dregeana*, Hmp., Nyl. Syn. p. 398, from which, however, it at once differs (as also from *P. stygiodes*, Nyl.) in the oblong form of the spores.

On rocks; very sparingly gathered.

P. FULIGINOSA (*Fr.*).

On rocks; very sparingly gathered, there being only slight though sufficiently distinct traces visible in a single specimen, associated with other lichens.

P. LICHINOIDEA, *Nyl.*, sp. Thallus subsimilis ut in *P. lanata*, sed deplanatulus, laciniis depressis (latit. circiter 0·3 millim.); medulla K non tincta. Apothecia et spermogonia non visa.

On the summit; amongst mosses on the ground.

PARMELIA HOTTENTOTTA, *Ach.*

On trunks of trees, very sparingly, and infertile.

Tribe PELTIGEREI.

PELTIGERA CANINA (*L.*).

Amongst mosses on trees; barren and not rightly developed. The few imperfect fragments gathered seem referable to this rather than to any other species of the genus, but can scarcely be rightly determined.

Tribe PHYSCIEI.

PHYSCIA FLAVICANS (*Sw.*).

On the branches of trees; infertile. One specimen approaches in colour to f. *crocea*, Ach.

F. MINOR. Thallus small or almost minute, branches short, attenuated; apothecia small, chiefly convex; spores 0·011–0·015 millim. long, 0·006–0·009 millim. thick.

On twigs; very sparingly gathered.

P. CHRYSOPHTHALMA (*L.*).

On branches; apparently not uncommon, and fertile.

To this belongs entirely *Tornabenia africana*, Mass. Lich. Cap. p. 84.

P. FLAMMEA (*L. fil.*).

On twigs; fertile.

The specimens, however, are from Little Namaqua Land; though it is also met with at the Cape.

P. PARIETINA (*L.*).

On branches and twigs; apparently common and fertile.

F. AUREOLA (*Ach.*).

On the bark of trees; probably common, though scarcely entirely typical.

P. LEUCOMELA * ANGUSTIFOLIA, *Mey. et Flot.*

Amongst mosses on the ground; sterile.

P. AFFIXA, *Nyl.*, sp. n. Subsimilis *P. obscuræ*, f. *lithoteæ*, sed tenuior, magis adpressa et substrato agglutinato. Thallus castaneo-fuscus, centro subgranulato-inæqualis areolato-diffractus, ambitu laciniato-radians laciniolis incisis contiguis (latit. 0·2–0·3 millim.); apothecia et spermogonia non visa.

On rocks; very sparingly gathered.

P. SETOSA (*Ach.*).

This does not occur typical, but only f. *deminuta*, with minute thallus and apothecia.

On rocks; very sparingly, and only a single apothecium visible.

PHYSCIA SUBPICTA, *Nyl.* Comparabilis videtur cum *P. picta* vel *ægialita* (Ach.), sed minor, thallo glauco-albido opaco læviore, lobulis ambitu planis brevioribus. Apothecia non visa.

Tribe GYROPHOREI.

UMBILICARIA PUSTULATA, *Hffm.*

On rocks towards the summit; apparently not uncommon.

The specimens gathered are very small, though fertile, and may perhaps be regarded as constituting a distinct form—f. *minor*, "thallus and apothecia very small."

U. RUBIGINOSA, *Pers.*

On rocks near the summit; fertile and apparently common.

Tribe LECANOREI.

PANNARIA RUBIGINOSA (*Thunb.*).

On the trunks of trees; fertile, also saxicole and sterile.

P. LEUCOSTICTA, var. **ISIDIOPSIS**, *Nyl.* Totus fere thallus isidio subcæsio tectus. Sporæ longit. 0·012–·018 millim., crassit. 0·008–0·011 millim.

On the bark of trees (as it would appear); only a single fragment seen.

LECANORA MURORUM (*Hffm.*).

On rocks; apparently common and fertile. The specimens scarcely differ from the European lichen, except that the thallus is subgranulated in the centre—a condition, however, which we have observed on maritime rocks in Scotland. The spores are 0·010–0·014 millim. long, 0·005–0·007 millim. thick.

L. CINNABARINA, *Ach.*

On rocks (quartzose); apparently common, but rarely fertile.

To this belongs *Callopisma capense*, Mass. Lich. Cap. p. 59, t. iii. f. 12–20. With reference to this species Nylander says *in litt.*, "Observatur thallum sæpe esse fere placodioideum et in typo Swartziano ex India occidentali minime esse vere nigro limitatum; nigredo ab Achario respecta est fortuita, nec characteri Lichenis adscribenda. Comparetur *L. holochracea*, Nyl., affinis, sed tota ochracea, obveniens in India orientali, Mt. Khassya (Dr. Hooker) et in Himalaya boreali-occidentali (Kurz.)."

L. CINNABARINA, var. **PERMINIATA**, *Nyl.* Differens lichene toto intensive cinnabarino-tincto. Sporæ longit. 0·008–0·011 millim., crassit. 0·005–0·006 millim.

On rocks; apparently common, but, like the type, rarely fertile: a very beautiful plant.

LECANORA CINNABARIZA, *Nyl.* Vix nisi subspecies *L. cinnabarinæ*, differens thallo tenuissimo rimoso, ambitu non effigurato (vel inter particulas prominentes substrati disserpens); apothecia innata depressa. Sporæ longit. 0·009–0·013 millim., crassit. 0·005–0·007 millim.

On rocks; very sparingly gathered.

L. AURANTIACA * ERYTHRELLA, *Ach.* Thallus luteo-vitelline or subpallescent. Spores 0·015–0·017 millim. long., 0·008–0·009 millim. thick.

On stones, associated with other lichens; sparingly.

L. SUBUNICOLOR, *Nyl.*, sp. n. Affinis *L. fulgescenti*, Nyl. Lich. St. Paul, p. 6, sed thallo tenuiore, minus læto, vitellino-aurantiaco, lævi, rimuloso; apotheciis aurantiacis biatoroideis (in *L. fulgescente* lecanorinis). Sporæ longit. 0·009–0·014 millim., crassit. 0·005–0·008 millim.

On rocks; very sparingly gathered.

L. PYROPŒCILA, *Nyl.*, sp. n. Thallus vitellino-aurantiacus opacus, minute granulosus, dispersus; apothecia croceo-aurantiaca (latit. circiter 0·5 millim.) margine thallino non prominulo. Sporæ longit. 0·011–0·013 millim., crass. 0·007–0·008 millim.

In external appearance this is almost similar to some small state of *L. schistidii* (Anzi); but the spores are different. From *L. pyracea* it at once differs in the granular thallus and the apothecia not being biatoroid.

On rocks; very sparingly seen.

L. PYRACEA, f. **PICTA** (*Tayl.*), *Nyl.* Apothecia distinctly margined; spores 0·011-0·016 millim. long, 0·006–0·008 millim. thick.

On rocks, associated with other lichens.

L. PRÆMICANS, *Nyl.*, sp. n. Subsimilis *L. ferrugineæ* (Huds.), sed apothecia laetius tincta, cinnabarino-coccinea (biatorina). Sporæ longit. 0·009–0·015 millim., crassit. 0·006–0·008 millim.; paraphyses gracilentæ.

Colore apotheciorum maxime insignis. Thallus sordide albidus, inæqualis, rugulosus. Apothecia plana, marginata (latit. 1 millim. vel minora), margine demum flexuoso; partes coloratæ ex acido chrysophanico reagentes.

On the bark of trees; only a single small specimen seen.

L. CONFRAGOSULA, *Nyl.*, sp. n. Thallus cinereus tenuis areolato-squamulosus vel areolato-diffractus (K—), hypothallo nigro instratus; apothecia nigra minuta (juniora margine thallino subalbicante tenui subcrenulato cincta, dein evanescente), plana (latit. 0·4 millim. vel minora); sporæ 8nae, fuscæ 1-septatæ, longit. 0·015–0·020 millim., crassit. 0·008–0·011 millim.; epithecium fuscum; paraphyses distinctæ mediocres; hypothecium incolor. Iodo gelatina hymenialis cærulescens, dein vinose rubens.

This species is referred to the section of *L. sophodes*, or almost to that of *L. atrocinerella*, Nyl.

On rocks (sandstone); rare.

LECANORA GLAUCO-LIVESCENS, *Nyl.*, sp. n. Thallus glaucescens tenuis rimosus, hypothallo nigricante limitatus; apothecia lurido-fusca vel livido-fusca, plana (latit. 0·5–0·6 millim.), subzeorina vel margine thallino tenui evanescente cincta; sporæ 8næ, incolores, ellipsoideæ, 1-septatæ, longit. 0·009–0·011 millim., crassit. 0·004–0·005 millim.; paraphyses graciles, sursum clava fuscescente. Iodo gelatina hymenialis vinose rubens. Spermogonia arthrosterigmatibus munita; spermatia oblonga, longit. 0·0035 millim., crassit. 0·0005 vix superantia.

This species belongs to the section of *L. disparata.*

On rocks; only sparingly gathered.

L. ELÆOPHÆA, *Nyl.*, sp. n. Thallus olivaceus, depresso-granulatus vel potius granulato-rugosus, tenuis, determinatus (hypothallo nigricante indistincto aut magis visibili limitatus); apothecia fusca, convexula (latit. 0·5–0·7 millim.), margine thallino tenui integro cincta aut magis convexa margine hoc excluso; sporæ 8nae incolores ellipsoideæ aut fusiformi-ellipsoideæ, uniseptatæ, longit. 0·012–0·016 millim., crassit. 0·004–0·006 millim.; epithecium fuscum; paraphyses gracilescentes. Iodo gelatina hymenialis vinose rubescens. Spermogonia arthrosterigmatibus munita longiusculis sat breviter articulatis (articulis crassit. 0·002–000·3 millim.); spermatia ellipsoidea vel oblongo-ellipsoidea, longit. 0·0015–0·0025 millim., crassit. vix 0·0010 millim.

This, like the preceding, as shown by the character of the spermogones, belongs to the section of *L. disparata*, although it might otherwise be readily supposed to be of the section of *L. erysibe.*

On rocks; rare.

L. GALACTINIZA, *Nyl.*, sp. Thallus albidus tenuis subareolato-rimosus; areolæ ambitu interdum subcrenatæ; apothecia fusca parva (latit. 0·3–0·5 millim.), margine thallino integro vix prominulo cincta; sporæ ellipsoideæ, longit. 0·010–0·013 millim., crassit. 0·006-0·007 millim.; paraphyses gracilescentes non bene discretæ et supra granuloso-inspersæ; epithecium fuscescens. Iodo gelatina hymenialis cærulescens, dein thecæ violascentes.

L. galactinella, Nyl. (in Obs. Lich. Pyr. Or., p. 53, erroneously written as "*L. galactina*"), differs from *L. galactina*, Ach., especially in the brown smaller apothecia; but *L. galactiniza*, which is subsimilar, is at the same time distinguished by the reaction of the thallus, K+, yellow; wherefore it may belong to the section of *L. subfusca.*

On rocks (quartzose); apparently rare.

Lecanora diffusilis, *Nyl.*, sp. n. Thallus albus vel albidus, inæqualis (crassit. circiter 0·5 millim.), rimosus (K +, yellow); apothecia nigra lecideina innata immarginata (latit. 1 millim. vel minora), intus concoloria, saepe 2–4 confluentia et inde difformia; sporæ ellipsoideæ, longit. 0·009–0·010 millim., crassit. 0·006 millim.; lamina tenuis apothecii tota sordide violascens. Spermogonia non visa.

This species seems to belong to the section of *L. atra*. *L. atroviolacea*, Flot. in Lechl. Pl. Maclov. 60, closely approaches.

L. **atrorimata**, *Nyl.*, sp. n. Thallus albus rugulosus rimoso-diffractus (crassit. circiter 0·5 millim.), rimis et ambitu nigris (K +, yellow); apothecia nigra innata plana lecideoidea immarginata (latit. circiter 1 millim.), intus obscura; sporæ 8nae incolores ellipsoideæ simplices, longit. 0·012–0·015 millim., crassit. 0·006–0·008 millim.; lamina tenuis apothecii violascens. Spermogonia non visa.

Allied to the preceding species, but at once differing in the nigro-rimate thallus and larger spores. In *L. atroviolacea*, Flot., the rimæ of the thallus are not black.

On rocks; only two fragments gathered.

L. **psaromela**, *Nyl.*, sp. n. Thallus cinereus opacus tenuis sublævigatus areolato-diffractus expansus; apothecia nigra (vel obscure fusconigra), plana (latit. 0·8–1·6 millim.), margine thallino integro cincta; sporæ oblongæ vel fusiformi-oblongæ, longit. 0·010–0·015 millim., crassit. 0·003–0·004 millim.; paraphyses non discretæ; epithecium fuscescens. Iodo gelatina hymenialis cærulescens (dein thecæ violacee tinctæ). Spermatia fusiformi-bacillaria, longit. 0·007–0·011 millim., crassit. 0·001 millim.

This species is most closely allied to *L. psarophana*, Nyl. Obs. Lich. Pyr. Or. p. 10, but differs especially in the plainer and darker (almost black) apothecia, and in the spores being usually longer, &c.

On rocks; very rare.

L. **xanthophana**, *Nyl. Add. Lich. And. Boliv.* p. 379.
On rocks; very sparingly gathered.

L. **smaragdula** (*Whlnb.*).
On stones; associated with other lichens, and only one or two squamules seen in the specimen.

Tribe Pertusariei.

Pertusaria amara (*Ach.*), *Nyl.*
On rocks; only a single fragment present.

P. **Wawreanoides**, *Nyl.*, sp. n. Sat similis *P. Wawreanæ*, Mass.

Lich. Cap. p. 78, t. viii. fig. 1–18 (excl. spermogoniis, quæ sane aliena), sed thecæ bisporæ (sporæ longit. 0·060–0·070 millim., crassit. 0·038–0·048 millim.). Iodo gelatina hymenialis cærulescens, dein thecæ vinose rubentes.

Thallus K+, flavens, dein cinnabarino-rubens. Apothecia incoloria. Spermatia bacilliformia vel bacillari-fusiformia, longit. 0·006–0·008 millim., crassit. 0·0008 millim.

On rocks; probably not uncommon.

Pertusaria subdealbata, *Nyl.*, sp. n. Thallus albidus, conferte areolato-rimosus (crassit. circiter 0·5 millim. vel tenuior); apothecia nigricantia (in protuberantiis thalli convexis subdifformibus innata, singulum in quavis protuberantia), stratum sectione nigricans tenue (latit. 1 millim. vel minoris, crassit. vix 0·2 millim. in sicco statu) exhibentia; sporæ 2næ, longit. 0·046–0·056 millim., crassit. 0·018–0·022 millim. Iodo gelatina hymenialis cærulescens, deinde thecæ vinose rubescentes. Spermatia recta, longit. 0·005 millim., crassit. 0·0005–0·0006 millim.

From *P. Wawreanoides*, to which it approaches, it is distinguished by the different character of the apothecia and the thalline protuberances, as also by the smaller spores. The reaction of the thallus is the same in both, viz. K^{+}_{+}, from yellow becoming saffron-ferruginous.

On rocks; apparently rare.

P. vepallida, *Nyl.*, sp. n. Thallus pallido-albidus, tenuis, lævigatus, areolato-rimosus; apothecia nigricantia, innata, plana, sublecanorina, difformia, subpruinosa, minuta (latit. vulgo 0·2–0·3 millim.), margine thallino parum vel vix prominulo (1–3 in quavis areola thallina fertili); sporæ 8nae, longit. 0·027–0·037 millim., crassit. 0·016–0·021 millim. Iodo gelatina hymenialis cærulescens, thecæ præsertim tinctæ. Spermatia recta, longit. 0·016–0·018 millim., crassit. 0·0005 millim.

This species is allied to *P. rubescens* (Tayl.); but this latter has the thallus somewhat thicker, rugose, the spores larger, &c.

On rocks; very sparingly gathered.

P. leioplaca, f. octospora, *Nyl.*

On the bark of trees, associated with other lichens; very sparingly gathered, but probably common.

Tribe Thelotremei.

Urceolaria deuteria, *Nyl. Lich. St. Paul*, p. 6.

On the ground; probably common.

U. subcuprea, *Nyl.*, sp. n. Thallus lurido-fuscescens vel subcupreus, opacus, tenuis, areolato-rimosus, superficie passim obsolete albido-reticulatus; apothecia nigricantia innata, demum supra pertusa (non actinostoma); sporæ incolores (vel vetustate infuscatæ), murali-divisæ, ellipsoideæ, longit. 0·018–0·022 millim., crassit. 0·009–0·010 millim.; perithecium cum hypothecio infuscatum. Iodo gelatina hymenialis non tincta. Spermogonia sterigmatibus longiusculis ramosis generis et spermatiis tenuiter fusiformi-oblongis (bacillaribus), longit. fere 0·004 millim., crassit. vix 0·0001 millim.

This species is very easily distinguished by the colour of the thallus and the thelotremoid apothecia. The thallus affords no reaction, either with K, CaCl, or with I. *U. stictica*, Krb., approaches less to it than *U. deuteria.*

On rocks; very sparingly gathered.

Tribe LECIDIEI.

LECIDEA CHLOROPHÆATA, *Nyl.*, sp. n. Thallus cinereo-virescens, tenuiter granulosus, sat tenuis, indeterminatus; apothecia fusca vel rufescenti-fusca (lat. 0·5–0·9 millim.), juniora plana marginata, demum convexa et sæpe plura minora aggregata vel botryoideo-conglomerata, intus albida; sporæ aciculares rectæ vel rectiusculæ, tenues, indistincte 3–5-septatæ, longit. 0·060–0·075 millim., crassit. 0·0015–0·0025 millim.; paraphyses graciles: epithecium dilute subcærulescens, hypothecium supra rufescens et ceteroquin incolor. Iodo gelatina hymenialis vinose rubens.

The thallus is minutely cellulose. With reference to the specific name, Nylander observes, "Acceptum est in lingua Latina nomen adjectivum *leucophæatus*, quamobrem etiam *chlorophæatus* regulariter admitti possit.

On rocks; sparingly gathered.

L. SUBALBICANS, *Nyl.*, sp. n. Thallus albidus, subopacus, tenuis, minute areolato-diffractus, subrugulosus (K +, flavescens); apothecia fuscescentia planiuscula, demum convexa (latit. 0·5 millim. vel minora), margine (sæpius pallescente vel albido) vix prominulo; sporæ 8næ, ellipsoideæ, longit. 0·009–0·011 millim., crassit. 0·005–0·006 millim.; paraphyses gracilescentes non bene discretæ; epithecium subsmaragdescens; hypothecium incolor. Iodo gelatina hymenialis cærulescens. Spermatia arcuata (rite evoluta forsan non visa, sed videntur longit. 0·012–0·016 millim., crassit. 0·0005 millim.).

This species approaches, as it seems, to *L. albicans*, Nyl., from India; but this latter has the thallus continuous, only rimose, the apothecia pale reddish, &c. Though lecanorine in appearance, the apothecia are entirely biatorine.

On rocks; apparently not uncommon, though rarely fertile.

Lecidea leucoxantha, *Spr.* Apothecia biatorina K+(chrysophanice reagentia). Forsan melius *Lecanora*; nam spermogonia habent arthrosterigmata breviarticulata, spermatiis bacilliformibus (longit. 0·003 millim., crassit. 0·0005 millim.).
On the bark of trees; only a single fragment gathered.

L. bumamma, *Nyl.*, sp. n. Thallus albidus, bullato-vesiculosus, bullis subplicatis, aggregatus (altit. cum basi 6–8 millim.), basi fusco-stipitatus; apothecia nigra plana innata immarginata (latit. 1 millim. vel minora), sæpe in depressionibus thalli oblonga, intus obscura; sporæ non visæ.
Thallus K+(flavens). E stirpe est hæc species *L. vesicularis*, jam bullis thallinis magnis (latit. 3–5 millim.) insignis.
On the ground; very sparingly gathered.

L. parasema, var. **elæochroma**, *Ach.*
On the bark of trees, usually associated with other lichens.

L. granulosula, *Nyl.*, sp. n. Quasi *L. enteroleuca* (Ach.), Nyl., præcipue differens thallo flavido minute granuloso vel subleproso. Apothecia convexula non marginata (latit. 0·4–0·5 millim.), intus tota albida; sporæ ellipsoideæ, longit. 0·009–0·011 millim., crassit. 0·006 millim.; epithecium cærulescenti-nigricans; paraphyses gracilescentes; hypothecium incolor. Iodo gelatina hymenialis cærulescens, dein vinose fulvescens.
On rocks, associated with various other lichens.

L. meiospora, *Nyl. Obs. Lich. Pyr. Or.* p. 38. Spores 0·011–0·014 millim. long, 0·007–0·008 millim. thick.
On rocks (schistose); sparingly seen.

L. terrena, Nyl. Thallus albidus, tenuis, subgranulatus; apothecia mediocria (lat. 0·7–1·4 millim,), epithecio cæsio-pruinoso; sporæ longit. 0·011–0·014 millim., crassit. 0·006–0·007 millim.
On the ground amongst quartz detritus, sparingly.

L. obumbrata, *Nyl.*, sp. n, Thallus umbrino-fuscus subopacus, sat tenuis (crassit. 0·5 millim. vel tenuior), areolato-rimosus, determinatus (medulla K e flavo subcinnabarino-tincta); apothecia nigra, plana vel convexiuscula (latit. 1 millim. vel minora), immarginata, intus cinerascentia; sporæ 8nae, oblongæ, simplices, longit. circiter 0·011 millim., crassit. 0·004 millim. (rite evolutæ vix visæ); paraphyses mediocres; epithecium fuscum; hypothecium subincolor.

This species probably belongs to the section of *L. tenebrosa*, though in consequence of the spermogones being unknown this is uncertain.

On rocks, very sparingly associated with other lichens.

LECIDEA CHALYBEIA, *Borr.*

On rocks; probably common.

L. CHLOROPOLIZA, *Nyl.*

On rocks; only sparingly seen.

L. CONTINGENS, *Nyl.*, sp. n. Thallus cinerascenti-albidus tenuis (crassit. circiter 0·2 millim.), lævigatus, rimoso-areolatus, areolis contiguis, rimis nigris angustis, nigro-limitatus (K+, flavescens, dein ferrugineo-rubescens, etiam præsertimque medulla ita tum tincta, at I—); apothecia nigra, superficialia, plana, marginata (latit. circiter 0·5 millim.), intus concoloria; sporæ 8nae, fuscæ, ellipsoideæ, 1-septatæ, longit. 0·010–0·013 millim., crassit. 0·004–0·007 millim.; epithecium obscuriuscule cærulescens; paraphyses mediocres; hypothecium fuscum. Iodo gelatina hymenialis cærulescens. Spermatia bacillaria, longit. 0·005–0·006 millim., crassit. fere 0·001 millim., sterigmatibus subsimplicibus vel parum prolifero-articulatis, sat tenuibus.

The characters of the spermogones indicate that this species belongs to the section of *L. superans*, Nyl.; but there is no thalline reaction with CaCl.

On rocks; very sparingly gathered.

L. HALONIA, *Ach.*

On rocks; apparently not uncommon, usually associated with other lichens.

L. SPURIA (Schær.).

On rocks; pretty frequent, but always associated with other lichens.

With regard to the systematic place of this species, Nylander observes *in litt.*, "Forsan satius consideranda ut *Lecanora*; nam spermogonia vix differunt a spermogoniis stirpis *L. sophodis*. Est verisimiliter *Buellia antarctica*, Mass. Lich. Cap. p. 68, t. iv. fig. 18–32."

L. INCURIOSA, *Nyl.*, sp. n. Thallus albidus, sat tenuis, granulatus vel granulato-subareolatus, inæqualis (K+, flavens); apothecia nigra, demum convexa immarginata (latit. 0·6–0·8 millim.), intus concoloria (strato hymeniali obscure in sectione cinerascente); sporæ 8nae, fuscæ, 1-septatæ, longit. 0·022–0·025 millim., crassit. 0·008–0·011 millim.; paraphyses subgracilescentes; epithecium et hypothecium fusca. Iodo gelatina hymenialis cærulescens, dein subincolor et thecæ vinose subrubescentes. Spermatia oblongo-cylindrica, longit. 0·003–0·004 millim., crassit. vix 0·001 millim. attingentia, sterigmatibus vulgo ex articulis saltem 2–3 constantibus parum tumidulis.

A species but little striking in appearance, belonging to the section of *L. spuria*.

On stones, generally on the underside; sparingly gathered, though what seems to be the barren thallus is more frequent.

Lecidea distrata, *Nyl.*, sp. n. Thallus albus vel albidus, tenuis, plano-areolatus vel areolato-diffractus (rimis nigris), K+(flavens), I—, hypothallo nigro subsparse instratus; apothecia nigra, innata, plana, submarginata (latit. 0·2–0·4 millim.), juniora margine thallino obsoleto cincta; sporæ 8nae, fuscæ, 1-septatæ, longit. 0·014–0·019 millim., crassit. 0·007–0·009 millim.; epithecium fuscum; paraphyses mediocres (non semper bene discretæ); hypothecium incolor. Iodo gelatina hymenialis intensive et persistenter cærulescens.

Forsan in stirpe *L. spuriæ* locum habet; pertinet ad species illas quæ ambigunt inter *Lecideas* et *Lecanoras*. Conferenda est *Lecanora confragosula*.

On rocks (quartzose); very sparingly gathered.

L. minutula (*Hepp.*).

On rocks; generally associated with other lichens, apparently common.

L. subtristis, *Nyl.*, sp. n. Thallus fuscus, tenuissimus, lævigatus, rimulosus; apothecia nigra, plana, marginata (latit. 0·5–0·7 millim.), intus albida; sporæ 8nae, fuscæ, biloculares, longit. 0·016–0·020 millim., crassit. 0·009–0·011 millim.; paraphyses mediocres, clava fusca; hypothecium incolor. Iodo gelatina hymenialis bene cærulescens.

In consequence of the spermogones not being visible, it is not certain whether this species be in reality a *Lecidea* belonging to *L. coniops* or rather a *Lecanora* of the section of *L. coniopta*.

On rocks (quartzose); very sparingly gathered.

L. myriocarpa, f. **marcidula**, *Nyl.* Thallo pallido evanescente, sporis longit. 0·010–0·011 millim., crassit. 0·004–0·006 millim., paraphysibus non bene discretis.

Perhaps a distinct species—though, as the spermogones are not present, this is not certain.

On rocks, associated with other lichens.

L. geographica (*L.*).

On rocks (quartzose) near the summit, very sparingly gathered.

Tribe Graphidei.

Opegrapha parvula, *Nyl.*, sp. n, Thallus cinerascens, obsoletus; apothecia nigra, minuta, rotundata vel oblongo-rotundata (latit. circiter 0·2 millim.), epithecio impresso; sporæ 8nae, incolores, fusiformes, 3-septatæ, longit. 0·022–0·027 millim., crassit. 0·003 millim.; paraphyses mediocres; epithecium luteo-fuscescens; hypothecium cum perithecio nigrum. Iodo gelatina hymenialis vinose rubens (præcedente cærulescentia).

This species is easily known from the characters given. The gonidia are subchroolepoid.

On stones, on the underside; only a single small specimen seen.

Tribe Pyrenocarpei.

Normandina pulchella (*Borr.*).

Amongst small mosses, associated with *Pannaria rubiginosa* (saxicole); very sparingly gathered and sterile.

Endocarpon hepaticum, *Ach., Nyl.*

On the bare ground; apparently not uncommon.

It will be seen from the above Enumeration that the present collection (made, as already observed, during a few days' excursions to the same locality) is larger, both in the total of species and varieties and also in the number of novelties gathered, than that of Dr. Wawra as recorded by Massalongo. At the same time the specimens collected both by Dr. Wawra and Mr. Eaton can evidently be regarded only as the firstfruits of the rich and rare Lichen harvest of the Cape that remains to be reaped by some resident botanist.

Lichenes Terræ Kergueleni:—an Enumeration of the Lichens collected in Kerguelen Land by the Rev. A. E. Eaton during the Venus-Transit Expedition in 1874–75. By the Rev. James M. Crombie, F.L.S. &c.

[Read February 3, 1876.]

The first record which we find of the Lichen-flora of this remote island is that given by Dr. J. D. Hooker and Dr. Thomas Taylor, in the 'London Journal of Botany,' vol. iii. (1844) pp. 634–658, amongst the other Antarctic Lichens collected by the former gentleman during the voyage of H.M. Discovery-ships 'Erebus' and 'Terror' (1839–43). The Kerguelen lichens thus enumerated amount to seventeen species, of which, however, at least one half must be excluded, as being hasty and erroneous determinations, resulting chiefly from the absence of microscopical analysis. This list was subsequently revised by the Rev. Churchill Babington for Dr. Hooker's 'Flora Antarctica,' vol. ii. (1847) pp. 519–542, where, with emendations and additions, it is increased to twenty-seven species and varieties. A considerable proportion of these, however, as in the former case and for the same reason, must be deleted. Unfortunately, I have not at present been able to find in Herb. Kew. any specimens of several of Dr. Taylor's critical species. These may probably be found in his herbarium, which I understand is now in Boston, U. S.; and perhaps on further search one or two may still turn up at Kew. The present valuable and comparatively large collection was made by Mr. Eaton at intervals from December 1874 to February 1875, at the three stations in the island which were visited by the Expedition. These were Royal Sound and Observatory Bay on the S.E., and Swain's Bay on the S.W., all three, as it would appear, possessing very much the same lichen-flora. Though several of the species bear at first sight a general resemblance to some of our northern lichens, yet on analysis they are found to be quite distinct, and for the most part are quite peculiar to this island. Most of the novelties amongst them have been briefly recorded by me in 'Journ. Bot.' for November 1875 and January 1876; and I here give their fuller diagnosis, with which Dr. Nylander, who most kindly assisted me in their determination, has favoured me.

Family COLLEMACEI.

Tribe LICHINEI.

LICHINA ANTARCTICA, *Cromb.*, sp. n. Quasi *L. confinis* minor (altit. 2 millim. vel minor), apotheciis et spermogoniis in clavulis subglobosis confertis fastigiatis inclusis. Sporæ ellipsoideæ, longit. 0·014–0·016 millim., crassit. 0·007–0·009 millim. Spermatia oblonga, longit. 0·003 millim, crassit. vix 0·001 millim.

On maritime rocks. Swain's Bay.

Very sparingly.

Tribe COLLEMEI.

AMPHIDIUM MOLYDOPLACUM*, *Nyl.*, sp. n. Thallus cinereo-plumbeus adnatus astroideo-diffissus, centro pallidior areolato-diffractus, laciniis (latit. circiter 1 millim.) ambitum versus latioribus radians. Apothecia rufa vel fusco-rufa, lecanorina (latit. 0·5–0·7 millim.) vel lecanoroidea, margine pallido-albido subintegro cincta. Sporæ 8næ ellipsoideæ vel suboblongæ, irregulariter 3-septatæ, longit. 0·016–0·021 millim., crassit. 0·007–0·009 millim.; paraphyses mediocres. Iodo gelatina hymenialis cærulescens, dein vinose rubens.

Facies nonnihil thalli coccocarpioidea (formis incisis adnatis accedens). Thallus crassitiei circiter 0·3 millim. Comparandum est etiam cum *Pannaria elæina* (Whlnb.).

On stones. Swain's Bay.

Sparingly gathered.

---

* This was erroneously printed as *molybdophæum* in 'Journ. Bot.'

Family LICHENACEI.

Tribe STEREOCAULEI.

STEREOCAULON CYMOSUM, *Cromb.* Thallus podetiis firmis subpollicaribus et usque ad dimidiam altitudinem subsimplicibus (vel parum ramosis) nudis, deinde dense dendroideo-ramosis in cymam conferte granuloso-tectam vel granulis subleprosis. Apothecia et spermogonia non visa.

On the ground. Observatory Bay.

Very sparingly gathered.

This seems a sufficiently distinct species, though unfortunately the few fragments seen are infertile.

Tribe CLADONIEI.

CLADONIA FIMBRIATA, *Hffm.*

On the ground, amongst mosses &c.

Apparently common.

C. FIMBRIATA, f. COSTATA, *Flk.* "Apotheciis pallidis."

Along with the type. Observatory Bay.

Apparently rare.

CLADONIA ACUMINATA (*Ach.*), *Norrl.*

On the ground.

Apparently common at all the stations, but sparingly fertile.

Tribe USNEEI.

NEUROPOGON MELAXANTHUS (*Ach.*).

On rocks.

Not uncommon at all the stations, and very variable, though (as well observed in Hook. Fl. Antarct.) the so-called varieties of the older authors are mere "states depending on age (and nature of habitat) rather than marked races."

N. M., f. SOREDIIFER. Thallus more or less, sometimes densely sorediiferous.

On rocks, along with the type. Swain's Bay and Royal Sound.

Infertile.

N. M., var. CILIATA, *Nyl. Lich. New Zeal.* p. 245.

On rocks. Observatory Bay.

Perhaps not uncommon, and equally variable with the type. The specimens seen are usually but of small size.

NEUROPOGON TAYLORI (*Hook. fil.*).

On rocks. All the stations.

Said by Dr. Hooker (Flor. Antarct. ii. p. 521) to be "very abundant on rocks from 100 to 1200 feet of elevation—by far the most handsome vegetable production of Kerguelen's Land." From all states of the preceding, from which it is easily recognized, it appears to be sufficiently distinct.

Tribe PARMELIEI.

PARMELIA STYGIODES, *Nyl.*, sp. n. Quasi *P. stygia* minor, magis contracta, thallo castaneo-fuscescente subopaco, apotheciis margine thallino integro. Thallus K ∓ (medulla flavescente). Sporæ ellipsoideæ minutæ, longit. 0·007–0·008 millim., crassit. 0·0045 millim. Spermatia subfusiformia acicularia (vix medio interdum obsolete tenuiora), longit. 0·005–0·006 millim., crassit. 0·0008 millim.

On rocks. Swain's Bay.

Very sparingly; and only in one or two apothecia are the spores visible.

Tribe PELTIGEREI.

PELTIGERA RUFESCENS, f. SPURIA (*DC.*).

Amongst mosses on the ground. Swain's Bay.

Sparingly gathered.

P. POLYDACTYLA, f. HYMENINA (*Ach.*).

Amongst mosses.

Along with the preceding, and equally sparingly seen.

Tribe LECANOREI.

PANNARIA PLACODIOPSIS, *Nyl.*, sp. n. Thallus sordide lutescens, placodioideo-divisus, radiis contiguis turgidulis, ambitu subcrenatis; apothecia rufa (latit. 1 millim. vel minora), margine thallino turgidulo subintegro vel subcrenato cincta. Sporæ ellipsoideæ simplices, longit. 0·012–0·018 millim., crassit. 0·010–0·011 millim.; paraphyses crassiusculæ. Iodo gelatina hymenialis leviter cærulescens, deinde vinose rubescens (thecis præsertim tinctis).

On rocks. Observatory Bay.

Sparingly gathered.

P. OBSCURIOR, *Nyl.*, sp. n. Est quasi *P. brunnea* obscurior, apotheciis nigricantibus et gelatina hymeniali iodo vinose rubescente.

On the ground, amongst decayed mosses. Observatory Bay.

Only a single specimen seen, associated with *Psoroma hirsutulum* (muscicole).

PSOROMA HIRSUTULUM, *Nyl.*, sp. n. Thallus inter apothecia parum evolutus; apothecia rufo-fuscescentia concava (latit. 1–2 millim.), receptaculo thallino toto dense albido-hirsuto vel vellereo, conferta. Sporæ longit. 0·016–0·021 millim., crassit. 0·009–0·014 millim.

On mosses and decayed stems. Observatory Bay.

Very sparingly gathered.

To this approaches *Parmelia paleacea*, Hook. fil. Fl. Antarct. p. 534, t. 197. f. 3, which, however, is less hirsute.

PLACOPSIS GELIDA (*L.*).

On rocks. Observatory Bay.

Sparingly.

PL. GELIDA, f. **LATERITIA**, *Nyl.* "Thallo toto ferrose ochraceo-tincta."

On rocks. Swain's Bay.

Apparently abundant.

LECANORA (PLACODIUM) ELEGANS, *Ach.*

On rocks. Swain's Bay and Royal Sound.

Probably not uncommon.

L. (PL.) ELEGANS, f. **LUCENS**, *Nyl.* Minor, thallo subvitellino. Sporæ longit. 0·011 millim., crassit. 0·005 millim.

On stems. Observatory Bay.

Sparingly, and associated with other lichens.

L. SUBUNICOLOR, *Nyl.* Minus evoluta, thallo macro. Sporæ longit. 0·009–0·015 millim., crassit. 0·004–0·007 millim.

On rocks. Royal Sound.

Very sparingly, only two or three apothecia being visible. The present specimen may therefore be slightly different from the Cape-of-Good-Hope plant.

L. VITELLINELLA, *Nyl.* Quasi *L. aurantiaca* * *erythrella*, Ach., vel potius *L. vitellinula*, Nyl. Minuta, sporis minoribus turgidulis, longit. 0·007–0·009 millim., crassit. 0·005–0·007 millim.

On rocks. Swain's Bay.

Very sparingly seen.

L. DIPHYELLA, *Nyl.*, sp. n. Thallus macula pallido-cinerea indicatus. Apothecia nigra lecideina marginata parvula (latit. 0·2–0·3 millim.), intus obscura. Sporæ 8næ, incolores, placodiomorphæ, longit. 0·012–0·017 millim., crassit. 0·008–0·010 millim.; paraphyses mediocres; epithecium cum perithecio et hypothecio nigricantibus. Iodo gelatina hymenialis intensive cærulescens (thecæ præsertim tinctæ).

Species peculiaris quæ videtur affinis *L. diphyi*, Nyl., sed notis datis apotheciis minoribus, hypothecio nigro, sporis crassioribus &c. differt.

Thalamium nonnihil lutescens. Hypothecium et perithecium K reactionem purpurascenti-dissolventem ostendunt. Spermogonia non visa.

On rocks. Royal Sound.

Perhaps not uncommon.

LECANORA MACROPHTHALMA (*Tayl.*). Etiam forma apotheciis nigricantibus. Sporæ longit. 0·021–0·023 millim., crassit. 0·011–0·015 millim.

Est e stirpe *Lecanoræ cinereæ*. Maxime notabilis thallo CaCl + (erythrinoso).

On rocks. At all the stations.

Apparently abundant.

L. ATROCÆSIA, *Nyl.*, sp. n. Thallus albidus aut albido-cæsius, tenuis, æquabilis, subrugulosus vel rugosus, hypothallo nigro limitatus. Apothecia atra, in receptaculis demum nonnihil protuberantibus recepta, margine thallino non prominulo, plana (latit. 0·8–1·5 millim.), subopaca, intus concoloria. Sporæ 8næ incolores ellipsoideæ, longit. 0·010–0·012 millim., crassit. 0·006–0·007 millim., totum apothecium in lamina tenui visum obscure violascens.

Affinis *L. atræ*, sed certe distincta species, differens jam thallo alio et spermatiis curvulis (apice supero curvatis) brevioribus (longit. 0·009–0·011 millim., crassit. vix 0·001 millim.). Thallus K+ (virescenti-flavens.

On rocks. At all the stations.

Frequent.

L. BROCCHA, *Nyl.*, sp. n. Thallus albidus tenuissimus (K+flavens); apothecia fusca mediocria (latit. 1–2 millim.), margine thallino crenato-dentato subplicato et involvescente recepta; sporæ ellipsoideæ simplices, longit. 0·015–0·017 millim., crassit. 0·006–0·007 millim.; paraphyses mediocres vel subcrassiusculæ; epithecium fuscum. Iodo gelatina hymenialis cærulescens, dein incolor thecis violaceo-tinctis. Spermatia bacillaria recta longit. 0·007–0·008 millim., crassit. 0·0007 millim.

On decayed mosses, and on dead stems. Royal Sound.

Apparently not uncommon. The apothecia in appearance are as in *Psoroma*, though their anatomic structure is not as in that genus. As shown by the spermogones, it belongs to the section of *L. atra*. The apothecia are rarely the host of a parasitic Fungillus, viz. *Patellaria antipodella*, Nyl., sp. n.

L. UMBRINA (*Ach.*), *Nyl.* Spermatia 0·016–0·022 millim. long, 0·0005–0·0006 millim. thick.

On stems. Observatory Bay.

Associated with *L. elegans*, f. *lucens*, &c.

LECANORA SUBLUTESCENS, *Nyl.* Omnino videtur similis *L. lutescenti*, DC., sed saxicola et sporis non evolutis visis. Thallus sulphureus subleprosus CaCl croceo-reagens.

On rocks. Swain's Bay.

Only two small fragments seen.

Tribe PERTUSARIEI.

PERTUSARIA PERRIMOSA, *Nyl. Lich. N. Zeal.* p. 253. Thallus albido-cinerascens tenuis rimoso-diffractus vel rimoso-areolatus, nigro-limitatus; apothecia in verrucis thalli convexis (sæpius rimosis) innata, nonnulla hymenia in quavis tali verruca thallina. Sporæ 4–8næ, longit. 0·055–0·105 millim., crassit. 0·03–0·07 millim.

Thallus K e flavo mox cinnabarino-ferruginescens. Spermatia subrecta vel vulgo leviter arcuata, longit. 0·016–0·023 millim., crassit. 0·005–0·006 millim.

On rocks. Swain's Bay.

Apparently not uncommon, though often barren.

P. PERRIMOSA, f. **SUBFERRUGINOSA**, *Cromb.* Thallus more or less ferruginous.

On rocks. Royal Sound.

Sparingly gathered.

P. CINERARIA, *Nyl.*, sp. n. Thallus cinereus tenuis rugulosus areolato-rimulosus determinatus (K–). Apothecia nigricantia in protuberantiis parum elevatis rotundato-difformibus (latit. 0·5–0·7 millim.) impressa punctiformia (1–4 in quavis protuberantia thallina). Sporæ 8næ ellipsoideæ, longit. 0·035–0·052 millim., crassit. 0.016–0·024 millim. Iodo gelatina hymenialis intensive cærulescens (thecæ præsertim ita tinctæ).

A *P. chiodectinoide*, Bagl., Anzi, affini differt thallo lævi depresso tenui &c. In lamina tenui apothecii conspicitur epithecium (fuscescens) K dilute subviolascens et thalamium flavescenti-tinctum (forsan ex elementis stromaticis ita reagens). In *P. chiodectinoide* thallus intus K flavens. Spermogonia non visa.

On rocks. Swain's Bay.

Only a single specimen gathered.

Tribe LECIDEI.

LECIDEA VARIATULA, *Nyl.*, sp. n. Thallus albidus, tenuiter subgranulosus, dispersus. Apothecia fusca (vel juniora pallescentia) aut demum nigricantia, plana vel concaviuscula, marginata (latit. 0·3–0·5 millim.), intus albicantia. Sporæ 8næ incolores ellipsoideæ simplices, longit. 0·011–0·015 millim., crassit. 0·006–0·007 millim., paraphyses graciles discretæ æquales (apice non crassiores), hypothecium incolor. Iodo gelatina hymenialis non tincta, sed thecæ solæ cærulescentes (dein violaceo-infuscatæ).

On decaying stems. Observatory Bay.

Very sparingly gathered, and only a few apothecia visible on the specimen.

This is a sufficiently distinct species, belonging to the section of *Lecidea mutabilis*.

LECIDEA ASSIMILATA, *Nyl.*

On the ground. Royal Sound.

Apparently not uncommon.

L. ASSENTIENS, *Nyl.*, sp. n. Thallus albidus tenuis rugulosus rimulosus (K flavens); apothecia nigra plana marginata (latit. 1 millim. vel minora), sæpe nonnihil difformia; sporæ 8næ incolores ellipsoïdeæ, longit. 0·009–0·012 millim., crassit. 0·005–0·006 millim., epithecium nigricans, paraphyses fere mediocres, hypothecium cum perithecio nigrum. Iodo gelatina hymenialis cærulescens, dein thecæ violaceo-fulvescentes.

Est arcte affinis *L. vorticosæ*, Flk., differt autem thallo, epithecio nigricante, thalamio incolori (non cærulescente). Epithecium sæpe ochraceo-suffusum.

On rocks. Royal Sound and Observatory Bay.

Very sparingly.

L. INTERSITA, *Nyl.*, sp. n. Thallus albidus vel cinerascens, tenuis, rimulosus (K+, flavens), hypothallo plumbeo-obscurato instratus; apothecia nigra marginata (latit. 1 millim. vel minora), intus concoloria strato hymeniali albo; sporæ 8næ incolores ellipsoideæ, longit. 0·012–0·015 millim., crassit. 0·006–0·008 millim., epithecium cærulescenti-infuscatum, paraphyses mediocres, hypothecium cum perithecio nigrum. Iodo gelatina hymenialis cærulescens, dein subincolor et thecæ vinose rubescentes. Spermatia arcuata, longit. 0·014–0·016 millim., crassit. 0·0005 millim.

Facie *L. contiguæ* vel *meiosporæ*, sed revera affinis *L. assentienti*.

On rocks. Observatory Bay.

Very sparingly gathered.

L. PHÆOSTOMA, *Nyl.*, sp. n. Thallus cinerascens tenuis rugulosus rimulosus; apothecia rufa plana prominula nigro-marginata (latit. 0·5–0·7 millim.), sæpe conferta et pressione mutua anguloso-difformia. Sporæ 8næ incolores ellipsoideæ, longit. 0·011–0·012 millim., crassit. 0·006–0·008 millim., epithecium luteo-fuscescens, hypothecium cum perithecio nigrum. Iodo gelatina hymenialis cærulescens, dein lutescens.

Thallus K flavescens, epithecium K roseo-violascenti-dissolutum. Species est peculiaris et facile dignota in stirpe *Lecideæ parasemæ*. Spermatia arcuata, longit. 0·015–0·018 millim., crassit. 0·0005 millim.

On rocks. Royal Sound.

Rather sparingly gathered.

Lecidea amylacea, *Ach.*, *Nyl.* The specimens seen are sufficiently similar to the European plant, differing only in the epithecium being brownish, while in the European plant it is subcærulescent.

On rocks. Swain's Bay.

Probably not uncommon.

L. subassentiens, *Nyl.*, sp. n. Thallus albidus tenuis, subrugulosus vel lævis, rimosus (K flavens); apothecia nigra plana marginata (latit. 0·5–0·7 millim.), intus obscure cærulescentia; sporæ 8næ ellipsoideæ, longit. 0·010–0·012 millim., crassit. 0·006–0·007 millim., epithecium cærulescens, paraphyses gracilescentes, hypothecium incolor, perithecium nigrum. Iodo gelatina hymenialis cærulescens, thecæ deinde subviolacee rubescentes.

Affinis *Lecideæ diasemoidi*, Nyl., sed differens sporis nonnihil minoribus et spermatiis longioribus. Facie externa satis convenit cum *L. assentiente*. Thalamium supra cærulescens.

On rocks. Royal Sound.

Very sparingly gathered.

L. perusta, *Nyl.*, sp. n. Thallus hypothallo nigro tenui æquabili continuo constans, in quo sparsæ areolæ fusco-rufescentes vel fusco-cupreæ, rotundato-angulosæ, minutæ, aggregatæ, impressæ, concaviusculæ et circumscissæ; apothecia nigra demum prominula convexiuscula, marginata aut submarginata (latit. circiter 1 millim.), intus tota obscura; sporæ 8næ incolores ellipsoideæ, demum nigrescentes, longit. 0·024–0·036 millim., crassit. 0·011–0·018 millim., pariete distincto, paraphyses gracilescentes, epithecium fuscescens, hypothecium incolor. Iodo gelatina hymenialis intensive cærulescens (etiam thecæ sic tinctæ).

Species videtur stirpis omnino propriæ, facie quodammodo accedens ad *L. fumosam*.

On rocks.

At all the stations, though very sparingly and rarely in its best-developed state.

L. asbolodes, *Nyl.*, sp. n. Thallus fuligineus subopacus tenuis continuus determinatus. Apothecia nigra plana marginata (latit. 0·5–0·6 millim.); sporæ 8næ subglobosæ vel breviter ellipsoideæ, longit. 0·008–0·010 millim., crassit. 0·007 millim., paraphyses graciles, thalamium cum hypothecio (in lamina tenui) lutescens, epithecium luteo-fuscescens, perithecium nigrum. Iodo gelatina hymenialis cærulescens, dein subincolor et thecæ (præsertim apice) violaceo-tinctæ.

Facies externa fere *Lecideæ leioteæ*, Nyl. in Flora, 1867, p. 328, quæ vero differt apotheciis vix marginatis, paraphysibus crassioribus &c. Variat thallus obsolete rimulosus.

On rocks. Royal Sound.

Apparently not uncommon.

Lecidea lygomma, *Nyl.*, sp. n. Thallus cinereus vel cinereo-cyanescens, tenuis, lævis, rimulosus, nigro-variegatus; apothecia nigra sublenorina (innata in receptaculo thallino lecanoroideo nigricante), plana (latit. 1 millim. vel minora), subcircumscissa, intus subconcoloria strato superiore subcæsio; sporæ 8næ incolores ellipsoideæ, longit. 0·011–0·015 millim., crassit. 0·006–0·007 millim., epithecium obscure cærulescenti-nigricans, paraphyses mediocres, hypothecium nigrum. Iodo gelatina hymenialis et cum thecis persistenter cærulescens.

Thallus K supra et intus flavens deindeque cinnabarino-rubens, I–. Species est peculiaris, faciei Lichenis e stirpe *Lecanoræ gibbosæ* vel fere *Thelotrematis* aperti. Margo lecanoroideus (etiam sæpius hic circumscissus, h. e. fissura cinctus) obliquus, intus tenuescens et ibi subalbicans obsoleteque radiatim aliquoties fissulus. Analysis apothecii affinitatem maximam prodit cum stirpe *Lecideæ contiguæ.*

On rocks. At all the stations.

Apparently not unfrequent.

L. subcontinua, *Nyl.*, sp. n. Thallus plumbeus (vel in f. *ferrea* ochraceus) lævigatus rimosus (crassit. circiter 0·5 millim.); apothecia nigra innata plana marginata (latit. 1 millim. vel minora), intus concoloria strato supero albido; sporæ 8næ ellipsoideæ, longit. 0·010–0·016 millim., crassit. 0·006–0·008 millim., epithecium luteofuscescens, paraphyses gracilescentes, hypothecium cum perithecio nigrum. Iodo gelatina hymenialis cærulescens, cærulescentia subpersistente. Spermatia longa rectiuscula vel rarius leviter arcuata, longit. 0·015–0·020 millim., crassit. 0·0005–0·0006 millim.

Species bene distincta in stirpe *Lecideæ contiguæ* vel in *L. parasemæ*, nam inter ambas ambigit.

On rocks. Swain's Bay and Royal Sound.

Very sparingly gathered.

L. Eatoni, *Cromb.* Thallus albus vel cæsio-albus, tenuis, continuus, opacus (K+flavens, I–), hypothallo nigro (sæpe maculose) instratus; apothecia nigra innata plana immarginata (latit. circiter 1 millim.), intus concoloria; sporæ 8næ oblongo-ellipsoideæ, longit. 0·009–0·011 millim., crassit. 0·004–0·005 millim., epithecium cærulescenti-nigricans, paraphyses breves crassæ, hypothecium fuscum. Iodo gelatina hymenialis cærulescens.

On rocks. Observatory Bay and Swain's Bay.

Very sparingly. This species, which is sufficiently distinguished by the above characters, belongs to the section of *L. contigua.*

L. subplana, *Nyl.*, sp. n. Thallus albus tenuis inæqualis areolato-diffractus; apothecia nigra plana marginata, demum sublobatula et convexiuscula margine evanescente, sat parva (latit. 0·5–0·9 millim.), intus albida; sporæ 8næ incolores, ellipsoideæ, longit. 0·009–0·013 millim., crassit. 0·004–0·006 millim., epithecium et perithecium cærulescenti-nigricantia, paraphyses mediocres, hypothecium incolor. Iodo gelatina hymenialis intensive et persistenter cærulescens.

Affinis *L. planæ* Lehm., a qua differt thallo albo, sporis majoribus et spermatiis brevioribus (hæc longit. 0·007–0·008 millim., crassit. 0·0007–0·0008 millim.). Thallus K–, I–.

On rocks. Observatory Bay.

Very sparingly gathered.

Lecidea sincerula, *Nyl.* Est *L. Dicksonii* Ach., thallo typico cinereo (nec ferro tincto). Sporæ longit. 0·009–0·012 millim., crassit. 0·006–0·007 millim. Iodo gelatina hymenialis cærulescens, dein vinose rubescens.

On rocks. Royal Sound.

Sparingly.

L. sincerula, f. **Dicksonii** (*Ach.*).

On rocks. Swain's Bay.

Associated with other lichens, and but sparingly seen.

L. tristiuscula, *Nyl.*, sp. n. Thallus fusco-cinerascens tenuis rugulosus determinatus, passim subrimulosus; apothecia nigra opaca superficialia plana marginata subrugulosa (latit. circiter 0·5 millim.), margine subcrenulato-ruguloso; sporæ 8næ fuscæ ellipsoideæ 1-septatæ (juniores placodinæ), longit. 0·018–0·024 millim., crassit. 0·010–0·011 millim., epithecium luteo-fuscescens, paraphyses gracilescentes, hypothecium incolor, perithecium nigrum. Iodo gelatina hymenialis cærulescens, deinde subvinose rubescens vel subfulvescens.

Species est e stirpe *Lecideæ spuriæ* et forsan *L. subtristis*, Nyl., sit maxime affinis. Spermogonia arthrosterigmatibus pauciarticulatis et spermatiis brevibus tenellis.

On rocks. Swain's Bay.

Associated with *Pertusaria cineraria*. Very sparingly seen.

L. myriocarpa (*DC.*), *Nyl.* A state with the thallus thin or evanescent.

On rocks. Swain's Bay.

Very sparingly gathered.

L. myriocarpa, f. **erumpens**. Thallus very thin. Apothecia erumpent.

On dead stems. Observatory Bay.

Associated with *Lecanora elegans*, f. *lucens*, and *L. umbrina*. Only a single specimen seen.

L. subplicata, *Nyl.*, sp. n. Thallus obsoletus; apothecia nigra plana elevato-marginata, margine tumidulo demum aliquoties sublobato-crenato, inde subangulosa et demum subgyrosa; sporæ fuscæ 1-septatæ, longit. 0·016–0·019 millim., crassit. 0·008–0·010 millim., sæpe curvulæ, epithecium luteo-fuscescens, paraphyses gracilescentes, hypothecium cum perithecio nigrum. Iodo gelatina hymenialis cærulescens, deinde vinose rubescens.

Facies externa fere *Sarcogynes simplicis* (Dav.), sed revera stirpis *Lecideæ coniopis*. Spermatia arcuata, longit. 0·015–0·022 millim., crassit. 0·0005 millim. Variant apothecia magis gyroso-corrugata et aggregata.

On rocks. Royal Sound and Swain's Bay.

Probably not uncommon.

L. CEREBRINELLA, *Nyl.* Similis *L. cerebrinæ* (Ram.), sed minor; apotheciis minoribus (latit. circiter 0·5 millim.) et sporis minoribus (longit. 0·009–0·011 millim., crassit. 0·006–0·007 millim.). Iodo gelatina hymenialis leviter cærulescens, dein vinose fulvescens.

Apothecia valde plicato-corrugata. Thallus albus tenuis rugulosus, K+ (flavens), evanescens quidem adest, at minime proprius. Verus thallus *L. cerebrinellæ* videtur obscure cinerascens tenuissimus continuus obsoletus.

On rocks.

L. GEOGRAPHICA (*L.*). The specimens are entirely similar to the European plant. Spores 0·024–0·031 millim., crassit. 0·012–0·014 millim.

On rocks. At all the stations.

Very sparingly gathered. This is the only crustaceous species from Kerguelen in which the medulla gives a bluish reaction with I.

Tribe PYRENOCARPEI.

VERRUCARIA TESSELLATULA, *Nyl.*, sp. n. Thallus cinereo-fuscescens æquabilis areolato-diffractus, sat tenuis (crassit. circiter 0·3 millim.); apothecia innata, pyrenio incolori, solum supra (ostiolo parum prominulo) nigra; sporæ 8næ ellipsoideæ, longit. 0·010–0·015 millim., crassit. 0·007–0·008 millim.

Affinis *Verrucariæ virenti*, Nyl., et *V. Novæ Angliæ*, Tuck., sed mox distans thallo lævigato (fere ut in *V. polysticta*, Borr., et areolis etiam magis discretis), sporis brevioribus &c. Gonidia diametro transverso 0·016–0·022 millim., sæpius 2 vel plura syngonidio (crassiusculo) juncta, interdum subseriata (chroolepoidea).

On rocks. Swain's Bay and Royal Sound.

Very sparingly gathered; and the specimen from the latter station atypical, in consequence of having been submersed in water.

V. OBFUSCATA, *Nyl.*, sp. n. Thallus umbrino-nigricans continuus tenuissimus vel subevanescens; apothecia pyrenio dimidiato-nigro mastoideo-prominulo (latit. basi fere 0·3 millim.), epithecio vix impresso; sporæ 8næ incolores oblongo-ellipsoideæ, longit. 0·020–0·032 millim., crassit. 0·010–0·014 millim. Iodo gelatina hymenialis vinose rubescens.

Comparanda est cum *V. obnigrescente*, Nyl. in Flora, 1875, p. 362, differens autem thallo alio et sporis nonnihil longioribus.

On rocks. Royal Sound.

Very sparingly gathered.

VERRUCARIA ÆTHIOBOLA, *Ach.* Spores 0·016–0·021 millim. long 0·007–0·010 millim. thick; and scarcely in any respect differing from the European plant.

On rocks. Royal Sound.

Sparingly seen.

V. PRÆVALESCENS, *Nyl.*, sp. n. Thallus subochraceo-albidus opacus tenuis rimulosus; apothecia pyrenio dimidiato-nigro subhemisphærico-prominulo majusculo (latit. 0·6–0·7 millim.), epithecio impressulo; sporæ 8næ incolores ellipsoideæ 3-septatæ, longit. 0·035–0·038 millim., crassit. 0·014–0·018 millim.

Est hæc in stirpe *V. pyrenophoræ* omnino distincta species.

On rocks. Observatory Bay.

Very sparingly; associated with *Lecidia intersita.*

V. KERGUELENA, *Nyl.*, sp. n. Thallus fusco-cinerascens vel pallido-cinerascens, tenuissimus, obsoletus; apothecia pyrenio nigro dimidiato mediocri (latit. basi 0·5 millim. vel nonnihil minora), subhemisphærice prominulo, epithecio punctiformi-impresso. Sporæ 8næ incolores ellipsoideæ murali-divisæ, longit. 0·016–0·025 millim., crassit. 0·007–0·010 millim., paraphyses graciles sat confertæ. Iodo gelatina hymenialis non tincta (protoplasma thecarum solum vinose fulvescens).

In stirpe *V. thelostomoidis* est species insignis.

On rocks. Royal Sound.

Very sparingly.

V. INSUETA, *Nyl.*, sp. n. Thallus albidus (aut varians albido-ochraceus) tenuis rimuloso-diffractus subrugosus (K—); apothecia pyrenio integre nigro, dimidia parte supera denudata subrugulosa convexa (latit. 0·25 millim. vel minore), epithecio parum impresso; sporæ 8næ incolores oblongæ 3-septatæ, longit. 0·014–0·017 millim., crassit. 0·003–0·004 millim., paraphyses graciles. Iodo gelatina hymenialis vinose rubens.

Est species peculiaris ad stirpem propriam *Verrucariarum* pertinens, quæ accedit ad stirpem *V. chloroticæ,* at thecis clavatis, paraphysibus brevioribus, gelatina hymeniali iodo violaceo-rubescente, differentias sistens conspicuas.

On rocks. Swain's Bay.

Very sparingly seen, associated with *Pertusaria cineraria.*

The additions thus made by Mr. Eaton to our knowledge of the lichen-flora of Kerguelen are thus not only very considerable in number, but also most interesting on account of the new types amongst them. Probably other species may have been collected by the botanists accompanying the American and German expeditions, which were stationed respectively at Molly Point and Betsy Cove, lying north and east of Observatory Bay. When the collections thus made have been recorded, I hope to be able to supplement the present memoir by a fuller catalogue of Kerguelen Lichens, containing also a revision of the species of Dr. Hooker's 'Flora Antarctica,' so far as the Kew Herbarium is available for this purpose.

A List of the Musci and Hepaticæ collected in Kerguelen's Island by the Rev. A. E. Eaton, A.M. By William Mitten, A.L.S.

[Read March 2, 1876.]

As nearly all the specimens were obtained from four localities, to avoid repetition, it will suffice to indicate the occurrence of the species in each by a single letter, thus:—R., Royal Sound, visited on the 20th October 1874; S., Swain's Bay, 16th January 1875; V., Vulcan Cove, 6th January 1875; and C., Hill N.W. of Mt. Crozier, 6th January 1875.

Musci.

Cynontodium conicum, *Mont.* (Aschistodon.)
V., C., without fruit.

C. Hookeri, *C. Müller, Syn.* i. 450. (Leptotrichum.)
R., with old fruit and young setæ.

Anisothecium vaginatum, *Hook. Musc. Exot.* t. 141. (Dicranum.)
S., small and barren.

Blindia curviseta, *Mitt. Musc. Aust.-Amer.* 56.
R., with young and partly ripe capsules; fine specimens.

Dicranum kerguelense, *C. Müller, Syn.* i. 370.
R., in large tufts without fruit.

DICRANUM (ISOCARPUS) TORTIFOLIUM, *Hook. f. et Wils.* (Weisia.)

V., near a waterfall, in tufts, with mature and old fruit.

CERATODON PURPUREUS, *Brid.*

R., barren.

GRIMMIA (SCHISTIDIUM) APOCARPA, *L.*

R., Cat Island.

A very small specimen with two or three capsules appears to be this species; in S., patches of crowded short stems with narrow, diaphanous, pointed leaves, probably a young state of another species, but all barren.

G. (DRYPTODON) CHLOROCARPA, *Mitt.*

C., barren.

G. (RHACOMITRIUM) LANUGINOSA, *Dill.*

V., hoary specimens without fruit.

ORTHOTRICHUM CRASSIFOLIA, *Hook. f. et Wils.*

R., fertile.

O. RUPESTRE, *Schleich.*

R., with fruit nearly and quite mature.

STREPTOPOGON AUSTRALIS, *Mitt. J. Linn. Soc.* xv.

R., a single stem only.

TORTULA (SYNTRICHIA) FUEGIANA, *Mitt. J. Linn. Soc.* 1859.

R., abundantly fertile, and with ripe capsules.

ENTOSTHODON LAXUS, *Hook. f. et Wils.* (Physcomitrium.)

R., S., with nearly mature fruit.

BARTRAMIA (PHILONOTIS) AUSTRALIS, *Mitt. in Hook. Fl. New Zealand,* 448.

S., a few barren stems.

B. (P.) APPRESSA, *Hook. f. et Wils.*

R., fruit, young.

B. (BREUTELIA) PENDULA, *Hook. Musc. Exot.* t. 21.

R., C., fruit plentiful, unripe.

B. (EUBARTRAMIA) PATENS, *Brid.*

R., C., fruit passing maturity.

BARTRAMIA (EUBARTRAMIA) ROBUSTA, *Hook. f. et Wils.*

R., with ripe fruit.

BRYUM (WEBERA) NUTANS, *Schreb.*

C., V., a tall drawn-up state, barren.

B. (W.) ALBICANS, *Wahlenb.*

V., barren.

B. (W.) CRUDUM, *Hedw.*

S., with fruit just mature.

B. (W.) ELONGATUM, *Dicks.*

S., fruit ripe.

B. (ECCREMOTHECIUM) PENDULUM, *Hornsch.*

R., Cat Island, some specimens tall with perfect fruit.

B. (E.) EATONI, sp. n. Synoica, caulis humilis gracilis subsimplex rubro-fuscus, folia inferiora remota omnia erecto-patentia anguste elliptico-lanceolata, nervo in acumen tenue læve excurrente, margine limbo tenui e seriebus cellularum elongatarum 4–5 composito, anguste reflexo, integerrima, cellulis angustis limitibus teneris areolata, pedunculus elongatus, theca pendula sporangio ovato collo brevi contracto, operculo convexo mamillato, peristomio parvo dentibus teneris processibus angustis ciliis in unum conflatis interpositis subæquilongis lævibus in membrana ad tertiam dentium longitudinis exserta impositis annulo latissimo circumdatis.

S., with perfect fruit.

Stems half an inch high; leaves green, unaltered in direction, wet or dry; seta an inch long, red, changing to brown.

In the form of its capsule, this resembles *B. inclinatum*, B. & S., but differs from all its near allies by its narrow, pungent, pointed leaves.

MIELICHHOFERIA CAMPYLOCARPA, *Hook. et Arn.* (Wiesia.)

PLAGIOTHECIUM ANTARCTICUM, *Mitt. J. Linn. Soc.* XV.

R., with mature and old fruit.

ACROCLADIUM POLITUM, *Hook. f. et Wils.* (Hypnum.)

R., a slender barren state.

STEREODON CUPRESSIFORMIS, *L.*

R., barren.

Amblystegium decussatum, *Hook. f. et Wils.* (Hypnum.)

R., V., all barren.

A. fluitans, *L.*

S., a large barren state.

A. uncinatum, *Hedw.*

R., V., all barren.

Hypnum (Brachythecium) paradoxum, *Hook. f. et Wils. Fl. Antarct.* ii. t. 155. f. 2.

R., S., with mature fruit.

H. (B.) salebrosum, *Hoffm.*

R., a silky elongated state ; S., a shorter form on boggy ground.

Psilopilum trichodon, *Hook. f. et Wils.*

C., with nearly ripe fruit.

Pogonatum alpinum, *L.*

S., with fruit not mature.

Andreæa acuminata, *Mitt.*

R., not fertile.

HEPATICÆ.

Plagiochila heterodonta, *Hook. f. et Tayl.*

R., without fruit.

Jungermannia cylindriformis, sp. n. Exilis, caulis procumbens ascendens subsimplex vix radicans, folia subalterna antice incurva oblongo-ovalia obtusa apice sinu parvo obtuso obtuse bidentata, dentibus sæpe conniventer incurvis, involucralia minora acute bidentata perianthio elongato cylindraceo obtuso apice plicato appressa.

R., creeping amongst *Cynontodium Hookeri*.

This minute species nearly resembles *J. inflata* in colour, foliage, and perianth.

Leioscyphus turgescens, *Hook. f. et Tayl.* (Jungermannia.)

R., with the preceding, barren.

L. pallens, *Mitt. J. Linn. Soc.* xv.

R., barren, with the last.

Lophocolea Novæ-Zelandiæ. *Nees.*

R., a few stems with perianths.

LOPHOCOLEA PALLIDE VIRENS, *Hook. f. et Tayl.*

V., barren.

LEMBIDIUM VENTROSUM, *Mitt. J. Linn. Soc.* xv.

C., with abbreviated stems in dense brownish green tufts; perianths, with the large capsule included, very large in proportion to the stems and leaves.

TYLIMANTHUS VIRIDIS, sp. n. Humilis, caulis erectus ascendensve apice decurvus subsimplex, folia distiche expansa oblongo-quadrata, apice oblique sinu irregulari lato subtruncato bilobata, lobis obtusis apicem versus subdentatis, cellulis parvis rotundatis limitibus pellucidis.

R., in loose tufts with *Entosthodon laxus.*

Stems green, half an inch high, (with the leaves) scarcely two lines wide. Leaves green, frequently convex from the recurvation of the margins.

MARSUPIDIUM EXCISUM, *Mitt. J. Linn. Soc.* xv.

R., barren.

BALANTIOPSIS INCRASSATA, sp. n. Caulis gracilis ascendens curvatus, folia distiche expansa biloba, carina complicationis apice recurva, lobo dorsali erecto-patente apice incurvo loboque ventrali duplo majore planiusculo ovato apice sinu parvo obtuso acute bidentato, marginibus denticulatis, cellulis parvis rotundis limitibus crassiusculis areolata.

C. A very small species, but distinct in its dense but scarious-looking areolation.

FOSSOMBRONIA AUSTRALIS, *Mitt. J. Linn. Soc.* xv. Perianth turbinate; margin angled and flexuose; spores roundish, with hyaline smooth limb.

R., V., with young capsules.

SYMPHOGYNA PODOPHYLLA, *Mont. et Nees.*

R., V., without fruit.

ANEURA MULTIFIDA, *Dumort.*

V., S., barren.

MARCHANTIA POLYMORPHA, *L.*

R., S., barren.

Notes on Algæ found at Kerguelen Land, by the Rev. A. E. Eaton. By G. Dickie, A.M., M.D., F.L.S., Professor of Botany in the University of Aberdeen.

[Read March 2, 1876.]

Fucaceæ.

D'Urvillea utilis, *Bory.*

Geogr. dist. Tierra del Fuego; Falklands; also in the open ocean between lat. 45° and 55° S., reaching the 65th degree of S. latitude in the meridian of New Zealand.

D'U. Harveyi, *H. f.*

Geog. dist. Cape Horn; Falklands.

Sporochnaceæ.

Desmarestia Rossii, *H. f. & Harv.*

Geog. dist. Cape Horn; Falklands.

D. chordalis, *H. f. & Harv.*

Geog. dist. Kerguelen only.

D. media, *Grev.*

This is doubtless a form of *D. aculeata* well known in Northern temperate and arctic seas.

D. viridis, *Grev.*

On *Macrocystis,* Observatory Bay.

Geog. dist. Cape Horn; Falklands; shores of W. Europe; American coasts from New York northwards; Unalaschka.

Laminariaceæ.

Macrocystis pyrifera, *Ag.*

Geog. dist. Antarctic seas from 40° to 64° S. lat.; Chili; New Zealand; Indian Ocean; California.

Dictyotaceæ.

Asperococcus sinuosus, *Roth.*

Royal Sound between tide-marks, only two small specimens.

Geog. dist. Widely distributed from the latitude of Spain to the Falklands; shores of Japan; Florida; California.

Chordariaceæ.

Adenocystis Lessonii, *H. f. & Harv.*

Between tide-marks in Observatory Bay.

Geog. dist. Cape Horn; Falklands; Auckland and Campbell Islands; Cockburn Island.

ELACHISTA FLACCIDA, *Aresch.*
On *Rhodymenia palmata*, Observatory Bay.
Geog. dist. Atlantic coasts of France and Britain.

ECTOCARPACEÆ.

ECTOCARPUS GEMINATUS, *H. f. & Harv.*
On shells of *Mytilus*, Observatory Bay, with trichosporangia only, but these abundant.
Geog. dist. Cape Horn; Falklands.

SPHACELARIA CORYMBOSA, n. sp.
Fronde estuposa; filis cæspitosis; ramis inferne paucis, dichotomis, superne subpinnatim decompositis, ramis alternis corymbosis.

The specimens are two to three inches long, cæspitose, but without fruit.

S. AFFINIS, n. sp.
Filis dense cæspitosis, erectis, parce dichotomis, articulis diametro subæqualibus, vel paulo longioribus; trichosporangiis solitariis, obovatis, breviter pedicellatis.
Swain's Bay.

The specimens are about half an inch in height, with the habit of the British *S. radicans.*

RHODOMELACEÆ.

RHODOMELA HOOKERIANA, *J. Ag.*
Swain's Bay.
Geog. dist. Falklands and Cape Horn.

POLYSIPHONIA ABSCISSA, *H. f. &. Harv.*
On roots of *Macrocystis* and on tubes of Annelids, Observatory Bay.

There are two forms of this species, one smaller and more rigid than the other; the *P. microcarpa* of the Antarctic Flora represents one form.

Geog. dist. Cape Horn; New Zealand; Tasmania.

DASYA BERKELEYI, *Mont.*
Swain's Bay.

Mr. Eaton's specimens belong to the variety *β. Davisii,* having a habit and colour different from the typical plant. There are examples in different stages; but all have the ramuli heterosiphonous.

Swain's Bay.
Geog. dist. Aucklands; Falklands; Cape Horn; Chiloe.

LAURENCIACEÆ.

PTILONIA MAGELLANICA, *Mont.*
Swain's Bay.
Geog. dist. Cape Horn and Falklands.

CORALLINACEÆ.

MELOBESIA ANTARCTICA, *H. f. & Harv.*
On *Ballia* &c., Swain's Bay.

M. LICHENOIDES, *Ell. et Sol.*

A single example, very luxuriant, having a surface of about 3 inches square, incrusting two sponges (*Microciona atrosanguinea*, Bk., and *Halichondria incrustans*, Jtn.), both British. It agrees in habit, texture, and character of keramidia with the species.

Geog. dist. Britain; France; Mediterranean; Norfolk Island.

M. KERGUELENA, n. sp.

Partim adnata, subconcava, circumscriptione orbiculari, margine parce undulata, keramidiis numerosis, conspicuis, subconcentrice distributis.

The description is taken from a specimen nearly entire and about two inches in diameter; there are fragments of others less regular in outline, probably owing to inequality of the surface of attachment. All are dull yellow with shades of pale red, and in texture hard and inflexible.

SPHÆROCOCCOIDEÆ.

DELESSERIA LYALLII, *H. f. & Harv.*
Observatory Bay and Swain's Bay.
Geog. dist. Falkland Islands.

D. DAVISII, *H. f. & Harv.*
Swain's Bay.
Geog. dist. Cape Horn; Falklands.

D. QUERCIFOLIA, *Bory.*
Swain's Bay.
Geog. dist. Cape Horn and Falklands.

D. CRASSINERVIA, *Mont.*
Swain's Bay.
Geog. dist. Auckland and Campbell Islands; Cape Horn; Falklands.

NITOPHYLLUM FUSCO-RUBRUM, *H. f. & Harv.*
Swain's Bay; abundant.
Geog. dist. Kerguelen only.

Nitophyllum lividum, *H. f. & Harv.*
Swain's Bay, a solitary example.
Geog. dist. Falkland Islands.

N. laciniatum, *H. f. & Harv.*
Swain's Bay.
Geog. dist. Cape Horn and Falklands.

GELIDIACEÆ.

Chætangium variolosum, *Mont.*
Observatory Bay, between tide-marks.
Geog. dist. Aucklands; Falklands; Cape Horn.

RHODYMENIACEÆ.

Plocamium Hookeri, *Harv.*
Swain's Bay.
Geog. dist. Kerguelen only.

Rhodophyllis capensis, *Ktz.*
On Annelid-tubes, Swain's Bay.

The few specimens collected by Mr. Eaton are dwarf and very narrow; they all have the structure of the genus, and, I think, must be referred to the above species.

Rhodymenia palmata, *L.*
Very luxuriant specimens, Swain's Bay and Observatory Bay.
Geog. dist. Greenland to Newfoundland; coasts of Scandinavia, Britain and France; Unalaschka; Brazil; Falklands and Cape Horn.

CRYPTONEMIACEÆ.

Phyllophora cuneifolia, *H. f. & Harv.*
Swain's Bay.

Professor Agardh considers it probably a form of *P. Brodiei.*

Geog. dist. Falkland Islands.

Ahnfeltia plicata, *Huds.*
Rocks at low-water mark, Observatory Bay.
Geog. dist. Temperate and colder seas in the northern hemisphere; Falklands.

Calophyllis variegata, *Bory.*
Swain's Bay.

Mr. Eaton's collection comprises different forms of this variable species.

Geog. dist. Peru; Chili; California; New Guinea; Cape Horn; Falkland and Auckland Islands.

CALOPHYLLIS TENERA, *J. Ag.*
Swain's Bay.
Geog. dist. South Shetland.

KALLYMENIA DENTATA, *Suhr.*, var *a.*
Swain's Bay.
Geog. dist. Cape of Good Hope.

GIGARTINA RADULA, *Esp.*
Swain's and Observatory Bays.

The collection includes various forms of this species.

Geog. dist. Cape of Good Hope; New Zealand; Auckland and Campbell Islands; California.

EPYMENIA VARIOLOSA, *H.f. & Harv.*
Swain's Bay.
Geog. dist. Kerguelen only.

HALYMENIA LATISSIMA, *H.f. & Harv.*
Rocks at low-water mark, Observatory Bay.
Geog. dist. Auckland and Campbell Islands.

CERAMIACEÆ.

CERAMIUM RUBRUM, *Ag.*
Swain's Bay.
Geog. dist. General in colder seas of both hemispheres.

PTILOTA EATONI, n. sp.
Swain's Bay.

Rachi filiformi, pinnis oppositis, inæqualibus, una majore alterna minore; pinnellis inferioribus subulatis, subsimplici serie articulorum constantibus, ultimis pectinatis; sphærosporis apice pinnullarum subsolitariis; favellis terminalibus, involucri ramis pectinatis.

This species resembles *P. Harveyi* in the character of the involucre, but differs in general habit, and in colour, which is dull purple, as well as in the structure of the larger and smaller pinnules.

Geogr. dist. Kerguelen only.

BALLIA CALLITRICHA, *Ag.*
Observatory Bay, on roots of *Macrocystis.*
Geog. dist. Falklands; New Zealand; Aucklands; Australia; Tasmania.

CALLITHAMNION SIMILE, *H.f. & Harv.*
On *Mytilus*, Annelid-tubes, and roots of *Macrocystis.*
Geog. dist. Kerguelen only.

CALLITHAMNION ROTHII, *Lyngb.*

Tide-pools, on *Mytilus*, Observatory Bay.

I can see no essential difference between Mr. Eaton's specimens and the plant from the northern hemisphere; it agrees in habit, and arrangement of tetraspores; the articulations are a little longer than in British examples.

Geog. dist. Atlantic shores from Greenland to Africa; N.E. shores of United States.

SIPHONACEÆ.

CODIUM ADHÆRENS, *Ag.*

Swain's Bay.

Geog. dist. Coasts of Europe; Australia; Cape of Good Hope; Ceylon; Mauritius; Friendly Islands; Loo-Choo Islands.

BRYOPSIS PLUMOSA, *Grev.*

Observatory Bay, a few specimens, very small.

ULVACEÆ.

ULVA LATISSIMA, *L.*

Observatory Bay.

Geog. dist. Very widely distributed in both hemispheres.

PORPHYRA LACINIATA, *Ag.*

Observatory Bay.

Geog dist. Temperate and colder seas of both hemispheres.

ENTEROMORPHA COMPRESSA, *Link.*

Geog. dist. Cosmopolitan.

PRASIOLA SAUTERI, *Menegh.*

West of Swain's Bay on wet rocks in a stream at 400 feet above the sea.

Geog. dist. European Alps to 9300 feet; Spitzbergen; streams of W. Greenland.

CONFERVACEÆ.

CLADOPHORA ARCTA, *Ktz.*

On *Mytilus*, at low-water mark, Observatory Bay and Royal Sound.

Geog. dist. German and N. Atlantic Oceans; Cape Horn and Falklands.

C. SIMPLICIUSCULA, *H. f. & Harv.*

One very small specimen which, I think, may be referred to this species, on Annelid-tubes, Observatory Bay.

Geog. dist. Cape Horn and Falkland Islands.

C. FLEXUOSA, *Griff.*

Observatory Bay.

Geog. dist. Shores of Europe; Massachusetts Bay.

In conclusion, excluding *Prasiola Sauteri*, which is a freshwater species, the Marine Algæ collected by Mr. Eaton are 52 in number; adding to these other 13 mentioned in the Antarctic Flora, the marine Algæ of Kerguelen are 65; they are included under the following families:—

Fucaceæ, 2.
Sporochnaceæ, 4.
Laminariaceæ, 2.
Dictyotaceæ, 2.
Chordariaceæ, 3.
Ectocarpaceæ, 3.
Rhodomelaceæ, 4.
Laurenciaceæ, 1.
Corallinaceæ, 3.
Sphærococcoideæ, 7.
Gelidiaceæ, 1.
Rhodymeniaceæ, 4.
Cryptonemiaceæ, 8.
Ceramiaceæ, 6.
Siphonaceæ, 3.
Ulvaceæ, 5.
Confervaceæ, 7.

Of these, 16 belong to the olive, 34 to the red, and 15 to the green series.

Nine, so far as is known, are peculiar to the island, viz. *Desmarestia chordalis*, *Sphacelaria corymbosa*, *S. affinis*, *Melobesia kerguelena*, *Nitophyllum fusco-rubrum*, *Plocamium Hookeri*, *Epymenia variolosa*, *Ptilota Eatoni*, *Callithamnion simile*.

Twenty-one, or nearly one third, are also found on various parts of the shores of Europe.

Postscript.

In the Bulletin of the United-States National Museum there is a summary of the Algæ collected during the Transit Expedition to Kerguelen: the species were examined by Professor Farlow, and are 22 in number. Of these, three are not in Mr. Eaton's very complete collection; I quote from Professor Farlow's notes.

"SPHACELARIA FUNICULARIS, *Mont.*?

"Quite a number of specimens too small for accurate determination probably belong to this species.

"RHODOMELA GAIMARDI, *Mont.*

"A single specimen of this was collected by Dr. Kidder. This species is new to Kerguelen, the nearest recorded station being the Auckland Islands.

"CALLITHAMNION PTILOTA, *H. & H.*

"New to Kerguelen, previously recorded at Crozet Islands."

The Marine Algæ of this island are therefore, so far as known, about 70 species.

Species ac Genera nova Algarum aquæ dulcis quæ sunt inventa in Speciminibus in Expeditione Vener. transit. hieme 1874–75 in Insula Kerguelensi a clar. EATON collectis. Auctore PAULO FREDERICO REINSCH. (Communicated by Dr. HOOKER, C.B., Pres. R.S., F.L.S.)

[Read April 20, 1876.]

AB Herbario Regio inquirendi causa mihi tradita specimina erant: ampullulæ vitreæ tres cum algis aquæ dulcis in spiritu vini asservatis, undecim specimina in charta siccata. Ampullula major continebat maximam partem omnium specierum observatarum; erant enim species 81, ad genera 45 spectantes. Numerus totus specierum algarum aquæ dulcis hucusque in insula Kerguelensi cognitarum est 106, ad genera 67 spectantium. Ex his sunt:—

Diatomophyceæ	21 species, 13 genera.
Phycochromophyceæ	33 species, 18 genera.
Chlorophyllophyceæ	50 species, 34 genera.
Melanophyceæ et Rhodophyceæ	2 species, 2 genera.

Omnes familiæ algarum aquæ dulcis, Ulotrichaceis, Chroolepideis, Confervaceis, Sphæropleaceis exceptis, inveniuntur in insula Kerguelensi. E Cladophoris, Chætophoris, Rhizocloniis nulla species est observata.

CAMPYLODISCUS, sp. n.

C. magnus elliptico-ovalis, utroque polo rotundato-obtuso, costis marginalibus radialibus crassis, usque ad tertiam partem latitudinis superficiei se pertinentibus, in quoque latere 22is–24is, areolas 21as–22as rectangulares includentibus, area media lævi; frustula a latere visa simpliciter spiraliter curvata areolis 21is–22is rectangularibus instructa. Diam. longit. 0·132 millim., diam. transvers. 0·066 millim.; costæ tres in 0·02 millim.

In speciminibus singulis inter *Schizosiphontis kerguelenensis* cæspites.

A *Campylodisci* frustulis oblongis *C. surirella*, Ehrenberg (Abh. Berlin. Acad. 1845, p. 362), mihi tantum ex diagnosi nota, proxima species videtur.

AMPHIPRORA, sp. n.

A. parva rectangularis subtilissime striata medio parum constricta utroque polo late truncato-rotundato, lineis intermediis duabus in medio

cellulæ æqualiter extrorsum curvatis aream mediam cruciformem lævem circumcingentibus, nodulo singulo et in quoque latere cellulæ in decussi linearum incluso et in summo utriusque lineæ. Longit. 0·0333 millim., latit. 0·0084 millim.

A. Pockornyana, Grunow, dimensionibus duplo majoribus, cellulis ovato-oblongis rotundatis, nodulo centrali, *A. minor*, Gregory, dimensionibus majoribus cellulis elliptico-oblongis, polis rotundatis, striis radiatis differunt.

GLŒOTHECE INVOLUTA, sp. n.

Gl. thallo non limitato inter Algas minores disperso; cellulis oblongo-cylindricis utroque polo rotundatis, diametro transversali duplo longioribus, singulis aut geminis, tegumentis binis crassissimis distincte plurilamellosis circumvelatis, cytioplasmate pallide ærugineo subtiliter granuloso, plerumque granulo singulo majore instructo. Longit. cellular. (c. indum. exter.) 0·0278–0·0333 millim., longit. cellular. (c. indum. inter.) 0·0248–0·0278 millim., longit. cellul. (sine indum.) 0·0112–0·013 millim.

Hab. inter algas minores muscis aquaticis insidentes.

Hæc *Glœothece* aliqua similitudine consentit cum *G. macrococca*, Rabenhorst (Fl. Europ. Alg. i. p. 62=*G. monococca*, Kützing, Tab. Phyc. i. tab. 23), itidem reperta plerumque in statu uni- et bicellulari; quæ species nova attamen est diversa, indumenti structura valde distincte lamellosa et cellulis longioribus a *G. monococca*, cujus integumentum semper est structura homogenea.

LEPTOTHRIX HYALINA, sp. n.

L. aggregata, cæspitulos dispersos et radicantes muscis aquaticis affixos formans, trichomatibus hyalinis, vaginis distinctissimis crassis hyalinis superne sæpissime vacuis et in summo apertis, cellulis tenuissimis diametro æqualibus, cytioplasmate punctulato. Diam. trichomatum 0·0028–0·0041 millim.; cæspitulorum altitudo 0·084–0·112 millim.

Hab. in foliis *Fontinalis* spec.

L. radians, Kütz. (Tab. Phycol. ii. tab. 59), proxima species distinguitur vaginis multo angustioribus cellulis crassioribus.

LYNGBYA MAJOR, *Kützing*, var. KERGUELENENSIS.

L. trichomatibus inter alias algas dispersis subrectis, cellulis intensive æruginеis subtiliter distincte granulatis, diametro 8plo–10plo brevioribus, vaginis amplis hyalinis (interdum fuscescentibus) distincte 8–12-lamellosis, cellulis interstitialibus nullis. Diam. trichomat. (c.

vaginis) 0·0361–0·0448 millim. Vaginarum crassit. 0·0084–0·0112 millim. Trichom. longit. 8–15 millim.

Hab. inter alias alas natantes et affixas in dispersis trich omatibus.

MASTIGOTHRIX ARTICULATA, sp. n.

M. trichomatibus prolongatis subcylindricis basin versus paulo incrassatis, distincte articulatis; articulis inferioribus indistinctioribus, superioribus loculamentis distincte disjunctis, diametro subæqualibus, cytioplasmate granulis majoribus instructo; sporis perdurantibus obovalibus dimidium (et paulo minus) trichomatis latitudinis æquantibus. Diam. trichom. (in basi) 0·0168 millim., diam. trichom. (in superiore parte) 0·0112 millim.

In singulis trichomatibus partim in superficie partim in strato summo physeumatis *Hormosiphontis leptosiphontis*, sp. n., nidulantibus observatum.

Mastigotrichi fuscæ, Kützing, simillima in forma ac crassitudine trichomatum distinguitur: cellulis distincte articulatis, cellulis perdurantibus minoribus a cellula infima sejunctis. Cellularum *M. fuscæ*, cytioplasma subtiliter granulosum, cellula perdurante diametrum cellularum æquante, basi lata (interdum intus excavata) cellulæ infimæ trichomatis arctissime adpressa, cytioplasmate homogeneo.

M. MINUTA, sp. n.

M. trichomatibus distincte articulatis apicibus rectis, articulis inferioribus dimidio latitudine brevioribus (et paulo magis); sporis perdurantibus obovalibus usque subsphæricis diametro dimidium trichomatis latitudinis æquantibus. Latit. trichom. (in basi) 0·0084–0·0097 millim., diam. spor. perdur. 0·0041 millim.

Hab. inter algas minores (*Leptothrix*, *Coleochæte*) in foliis muscorum aquatilium insidentes.

A *M. ærugineo*, Kütz., dimensionibus plusquam duplo minoribus distincta species. In trichomatibus singulis vaginæ infima pars paullo incrassata et lamellosa, sed cellula perdurans non inclusa lamellis.

HYDROCOLEUM EATONI, sp. n.

H. fasciculis liberis inter alias algas dispersis usque ad 18 millim. longis, in summis sensim attenuatis, trichomatibus olivaceo-viridibus (a latere visis) 8is–12is consociatis et leviter contortis, subtilissime distincte articulatis, cellulis distinctis omnibus homogeneis diametro quintuplo brevioribus, cytioplasmate dense punctulato; vaginis achrois membranaceis duris subtiliter lamellosis, trichomatum fasciculi latitudinis dimidium crassis. Diam. fasciculi (in media parte) 0·056–0·086 millim., diam. trichom. 0·0041–0·0056 millim.; vagin. crassitudo 0·002 millim.

Hab. inter muscos aquaticos (*Fontinalis*) et alias algas (*Vaucheria, Schizosiphon*) immixtum.

Hoc *Hydrocoleum* consentit cum *H. helvetico*, Nægeli, in fasciculorum dispositione, sed differt dimensionibus fasciculorum plusquam quintuplo majoribus, trichomatum diverso colore et cellulis brevioribus.

NOSTOC HYDROCOLEOIDES, sp. n.

N. subtilissimum physeumate in modo *Hydrocoleorum* teretiformi prolongato peridermate distincto hyalino cincto; ex trichomatibus et rectis et paulo contortis (5is–10is) fasciculatim conjunctis formato; trichomatibus pallide ærugineis parallelis leviter contortis, vaginulis hyalinis velatis; cellulis vegetativis post divisionem diametro paulo longioribus, cytioplasmate punctulato, cellulis perdurantibus ceteris paulo majoribus sphæricis in trichomatibus sparsis. Diam. trichom. 0·0022–0·0028 millim., diam. fasciculi (in media parte) 0·0112–0·0224 millim.

Hab. inter *Tolypothrix Nægelii*, Kutz., et in massa parvula Diatomacearum foliis muscorum aquatilium et *Nitellæ Hookeri* adhærente.

Hæc plantula paradoxa secundum structuram et physeumatis et trichomatum *Nostoc* generis bonam speciem se ostendit. Trichomata integumento communi distinctissime clausa vix sunt discernenda a trichomatibus specierum singularum. Species unica *Nostoc* generis hucusque cognita physeumate filamentoso, a ceteris speciebus physeumate sive plano sive sphærico sat distincta.

N. POLYSACCUM, sp. n.

N. physeumate coriaceo irregulariter sphærico et subreniformi, colore subaureo-fusco, magnitudine seminis sinapeos ad *Pisi sativi*, intus loculamentoso ac dissepimentis coloratis lamellosis et radialiter et transversaliter positis percurso, peridermate firmo coriaceo fuscescente, trichomatibus centralibus paulo flexuosis; cellulis sphæricis colore pallide olivaceo, cytiodermate distincte dupliciter striato cellulis perdurantibus sphæricis, ceteris cellulis paulo latioribus. Diam. cellular. 0·0041 millim., diam. cellul. perdur. 0·0056 millim., diam. physeumatis 2·5–3 millim.

Forma (an status peculiaris evolutionis ?) physeumate ex trichomatibus brevioribus vaginis amplis hyalinis homogeneis (in modo *Hormosiphontis*) inclusis laxissime cohærentibus exstituto.

N. POLYSPORUM, sp. n.

N. physeumate sphærico magnitudine pisi minoris, indumento crasso hyalino distinctissime plurilamelloso velato; trichomatibus laxius positis subcontortis, pallide ærugineis, cellulis sphæricis arctissime conjunctis, post divisionem transverse ellipticis, cellulis perdurantibus numerosissimis sphæricis ceteris cellulis duplo majoribus, cytiodermate crasso. Diam. cellular. 0·0028 millim., diam. cellular. perdurant. 0·0041–0·0058 millim., diam. physeumatis 3–4 millim.

Inter alias algas fluitans (in paucis speciminibus observatum).

A persimilibus *N. gymnosphærico* et *N. cæruleo,* Kützing (Tab. Phycol. ii. tab. 3. fig. 3, 4), differt indumento plurilamelloso, cellulis perdurantibus numerosioribus.

NOSTOC LEPTONEMA, sp. n.

N. physeumatibus usque semini sinapeos æqualibus, sphæricis, paulo elasticis, arctissime conjunctis cohærentibus, indumento exteriore subcrasso hyalino homogeneo; trichomatibus prolongatis, multipliciter contortis laxius (in majoribus) et densius (in minoribus) intricatis; cellulis oblongis polis attenuatis, laxe se adtingentibus; cellulis perdurantibus sphæricis usque subovalibus, sparsis, ceteris cellulis paulo plusquam duplo majoribus. Diam. cellular. 0·0015–0·0024 millim., diam. cellular. perdur. 0·0056 millim., diam. physeumatis 0·2–1·5 millim.

Hab. in *Fontinalis* caulibus et foliis physeumatibus cohærentibus, partim corpora uvæformia formans.

E *Nostocibus* physeumate sphærico, *Nostoc aureum* (Kütz. Tab. Phy. ii. tab. 1. fig. 4) (planta marina) proximum in magnitudine et textura physeumatis ac crassitudine trichomatum; hoc *Nostoc* differt trichomatibus brevissimis valde curvatis cellulis perdurantibus minoribus. Inveniuntur interdum *Fontinalis* foliis insidentia corpora ex physeumatibus parenchymatice conjunctis varia magnitudine formata.

N. L., forma CRYSTALLOPHORUM.

Physeumatibus corporibus crystallizatis subsphæricis inclusis ex crystallis (ferri oxydati ?) radialiter dispositis formatis. Diam. corpor. crystallis. 0·0224–0·05 millim.

ANABAINA CONFERVOIDES, sp. n.

A. stratum tenue formans e subtilioribus trichomatibus prolongatis rectissimis parallelis in muco communi nidulantibus, cellulis distinctissimis rectangularibus usque subquadraticis, spatiis interloculatis angustioribus distinctis sejunctis, diametro transversali paulo longioribus (usque duplo), cytioplasmate subtiliter granuloso colore pallide ærugigineo; cellulis perdurantibus ellipticis, ceteris cellulis paulo latioribus et longioribus. Diam. cellul. 0·0022–0·0028 millim.

In stratis tenuioribus inter alias algas.

Hæc species peculiaris distinguitur ab omnibus hucusque cognitis speciebus cellulis angulosis (nec sphæricis nec ellipticis).

A. INVOLUTA, sp. n.

A. libere natans, e tenuioribus, trichomatibus prolongatis multipliciter involutis, cellulis sphæricis et ellipticis (in statu indiviso) intermixtis, cytioplasmate subtiliter granuloso cytiodermate extrorsum muco hyalino tenui velato; cellulis perdurantibus (sporis) sphæricis sparsis ceteris cellulis paululo latioribus, cytiodermate crasso distincto, cytioplasmate granuloso. Diam. cellular. 0·0024–0·0032 millim., diam. cellular. perdur. 0·0041 millim.

In trichomatibus singulis inter alias algas Phycochromaceas interjectis.

Ab *A. circinali* in trichomatum forma persimili differt cellulis plusquam quadruplo minoribus, cytioplasmate subtiliter granuloso (in *A. circinali* granulis majoribus dense repleto).

HORMOSIPHON LEPTOSIPHON, sp. n.

H. globosum, magnitudine *Pisi sativi*, olivaceo-viride, physeumate subcartilagineo intus molli, indumento exteriore subtenace; trichomatibus prolongatis, marginem physeumatis versus radialiter dispositis, subcontortis, pallide ærugineis, indumento hyalino homogeneo decolorato subtenui velatis; cellulis subsphæricis subarcte conjunctis; cellulis perdurantibus sphæricis, ceteris cellulis duplo latioribus. Diam. cellul. 0·0028 millim., diam. cellul. perdurant. 0·0056 millim., diam. physeumatis 3·5–6 millim.

In physeumatibus singulis inter *Schizosiphontis Kerguelensis* cæspites.

Physeumatum observatorum duo procreant intus physeumata singula filialia ellipsoidea trichomatibus brevissimis subrectis et leviter contortis indumento crasso hyalino decolorato velatis densissime repleta, indumento communi distincto velata. Physeumatis externa pars plerumque ex trichomatibus physeumatum filialium trichomatibus simillimis formata. Superficies physeumatum est vestita plantulis variis egregie *Stigeoclonio subtili*, n. sp., singulis filis *Euactidis Kunzeanæ* et *Polypotrichis flaccidæ*.

9. H. CORIACEUS, *Kütz.*, var. KERGUELENENSIS.

Physeumate irregulariter expanso, subplano, subcoriaceo, colore obscure rubro-fusco, in sectione transversali ex stratis 5is–7is formato, peridermate (sectionis transversalis physeumatis) lateris superioris crassiore lamelloso fusco, lateris inferioris peridermate tenuiore; trichomatibus vermiculiformibus multipliciter contortis, vaginis fuscis amplis distinctissimis plurilamellosis, cellulis sphæricis colore pallide ærugineo. Diam. cellular. 0·0041 millim., diam. trichom. (cum vaginis) 0·0224–0·0278 millim.; physeumatis crassitudo 0·139–0·168 millim.

Specimina majora in spiritu vini asservata ac in charta intensa.

"Marshy ground near Vulcan Cove, Kerguelen's land, *coll. Eaton*," in schedula.

SCHIZOSIPHON KERGUELENENSIS, sp. n.

S. cæspitosus, cæspitulos confertos radialiter dispositos usque 6 millim. altos in muscis aquaticis affixos formans; trichomatibus radiantibus e basi repetite dichotomo-ramosissimis in summis fastigiatis, pseudoramulis ultimis corymbosis fasciculatis, apicibus paulatim subangustatis; vaginis pseudoramulorum ultimorum fuscis integerrimis cellularum diametro subæqualiter crassis, vaginis trichomatum inferioris partis crassioribus dense subtiliter lamellosis, cellulis omnibus æqualibus distinctis, diametro subæqualibus apicem pseudoramulorum versus non decrescentibus, cytioplasmate colore pallide olivaceo-viridi, granulis majoribus distinctis dense repleto; cellulis perdurantibus singulis aut compluribus basilaribus subsphæricis diametro cellularum æqualibus. Diam. trichom. (in diversis locis mensuratus) 0·0168–0·0333 millim., diam. pseudoramulorum ultimorum 0·013–0·0168 millim., diam. cellular. 0·0056–0·0084 millim.

Hab. in muscis aquaticis (*Fontinalis*) caules densissime pelliculæformiter inducens, et in singulis cæspitulis dispersis in *Nitellæ Hookeri*, sp. n., cellulis.

Hæc species elegantissima in cæspitulis *Fontinalis* in caliculo vitreo inclusis copiosissima est reperta, inprimis speciminis majoris caules densissime erant obtecti. Cellularum funiculus singulis locis haud raro et simpliciter et dupliciter contortus, quæ partes trichomatum paulo sunt incrassatæ; basin trichomatum versus cellularum funiculi plerumque sunt contorti; trichomatum infimæ partis vaginæ plurilamellosæ et trichomatum infima pars cuneiformiter angustata in filum singulum producta.

SCHIZOTHRIX HYALINA, *Kütz.*, var. **RAMOSISSIMA**.

Trichomatibus *Schizosiphonti* insidentibus subtilissimis funiculis et submoniliformibus et subcylindraceis, pallide ærugineis, vaginulis amplis hyalinis cinctis; pseudoramulis numerosis erectis flagelliformi-attenuatis. Diam. trichomat. (cum vaginulis) 0·0022–0·0056 millim., diam. trichom. intern. 0·0011 millim.; altitudo plantulæ 0·8 millim.

Hab. in *Schizosiphontis kerguelenensis* trichomatibus in cæspitulis dispersis.

SIROSIPHON VERMICULARIS, sp. n.

S. e minimis, cæspitulis parvulis trichomatibus subrectis summis attenuatis procumbentibus intertextis, plus minusve ramosis, ramulis alternantibus apicem versus sensim attenuatis, ramulis summis diametri trichomatis primarii dimidio tenuioribus; trichomatum cellulis uniseriatis arctissime conjunctis, cytiodermate subcrasso firmo fuscescente, cytioplasmate subtilissime granuloso; ramulorum cellulis apicem ramulorum versus angulosis confervoideis; vaginis (trichom. primar.)

tenuioribus (vix cellularum diametri octavam partem) simpliciter striatis cellulas arctissime includentibus; cellulis interstitialibus nullis. Diam. trichom. primar. 0·0112 millim., diam. ramulorum 0·0056 millim.

In cæspitulis singulis, inter alios *Sirosiphontes, Hormisiphonti coriaceo* ("near Vulcan") adhærentes.

Ex omnibus *Sirosiphontibus* hucusque cognitis species minutissima *Sirosiphon*, in ramulorum cellulis diversis a cellulis trichomatis primarii *S. sylvestri*, Itzigsohn, proximus sed sat distinctus: trichomatibus tenuioribus, cellulis cytiodermate tenuiore indistincte articulatis.

SIROSIPHON, sp. n.

S. e minoribus, trichomatibus singulis inter alias algas dispersis, irregulariter pinnato-ramosis, ramis bilateralibus trichomati primario æqualiter formatis et æqualiter crassis, summis non attenuatis; cellulis subsphæricis spatiis hyalinis disjunctis, cystiodermate tenui homogeneo subhyalino, cytioplasmate subhomogeneo pallide ærugineo; vaginis crassis hyalinis subhomogeneis decoloratis; cellulis interstitialibus? Diam. cellular. 0·0041–0·0056 millim., trichomat. crassit. 0·0112–0·013 millim.

In trichomatibus singulis inter alias *Sirosiphontes* et inter *Scytonema castaneum*, inter *Hormosiphontem coriaceum* ("near Vulcan").

S. velutinus et *S. hormoides*, Kützing, trichomatibus crassioribus fasciculato-ramosis et dichotome ramosis distinctus. *S. panniformis*, Kütz., distinguitur ramis elongatis trichomate primario tenuioribus et cellulis interstitialibus.

S. KERGUELENENSIS, sp. n.

S. trichomatibus ramosissimis, trichomate primario procumbente, ramis irregulariter ramosis, ramulis ultimis apicem versus æqualiter latis; cellulis trichomatis primarii ac ramulorum ovalibus usque irregulariter sphæricis in seriem simplicem dispositis, intervallis hyalinis usque cellularum longitudinem æquantibus disjunctis, articulis tubuliformibus angustissimis (lacunis tubuliformibus in muco vaginæ) conjunctis, cytioplasmate subhomogeneo dilute ærugineo, cytiodermate subtili decolorato (cellularum trichom. primarii crassiore fuscescente); cellulis summis ramulorum cohærentibus lyngbyaceis; vaginis crassis hyalinis decoloratis subhomogeneis (vaginis trichom. primarii sublamellosis aureis). Diam. trichom. primar. 0·0278–0·0333 millim., diam. ramulor. 0·0248 millim., diam. cellular. 0·013 millim.

In trichomatibus singulis inter alias *Sirosiphontes* cum præcedente.

Hic *Sirosiphon* primo pro forma propria *S. ocellati* habitus, cui est persimilis in trichomatis ramificatione et crassitudine, sed propter propriam de ceteris *Sirosiphontibus* discedentem structuram trichomatis, propriam speciem se offert.

Sirosiphon Oliveri, sp. n.

S. cæspitulis parvulis, trichomatibus adscendentibus prolongatis subramosis, ramulis singulis (et raro ramulis compluribus brevioribus approximatis) et leviter contortis, e serie simplici cellularum formatis; cellulis ovalibus diametro dimidio brevioribus (et paulo magis et minus), cytiodermate firmo crasso extrorsum fuscescente, cytioplasmate subhomogeneo obscure-ærugineo; vagina membranacea simplici subtenui; cellulis interstitialibus nullis. Diam. trichomatum (cum vaginis) 0·0196–0·0224 millim,

In cæspitulis parvulis inter *Hormosiphontem coriaceum* cum cæspitulis *Scytonematis castanei* intermixtis; cum præced.

A *S. velutino*, Kütz., et *S. hormoide*, Kütz., speciebus proximis in cellularum forma ac dispositione, differt trichomatibus subintegris, vaginis tenuioribus.

ASTEROSPHÆRIUM*, gen. nov. Protococcacearum.

Cœnobium sphæricum, intus excavatum, libere natans, e cellulis angulosis parenchymatice arctissime conjunctis (sicut in *Pediastris*) extrorsum pyriformiter ampliatis et subito angustatis formatum.

Asterosphærium elegans, species una.

Cœnobium sphæricum e cellulis 64 aut 128 formatum. Diam. cœnobii ex cellulis 138 formati 0·144 millim.

Hab. inter algas minores libere natans (in paucis speciminibus observatum).

Hoc genus proxime se continuat generibus *Protococcacearum*, cœnobio ex cellulis parenchymatice conjunctis formato (*Hydrodictyon*, *Pediastrum*, *Cœlastrum*, *Staurogenia*). Cœnobii dispositio fit in quaque hemisphæra secundum seriem: 1, 6, 11, 16, 21, 26 (seriem arithmeticam primi ordinis cum numero differentiali =5). Quo dispositionis modo hoc genus discedit a *Pediastro*, genere proximo.

Pediastrorum plurimarum specierum dispositio cœnobii fit, in speciminibus regulariter formatis, secundum seriem: 1, 5, 10, 16 (seriem arithmeticam secundi ordinis cum serie differentiali prima: 4, 5, 6, et numero differentiali =1).

In *Asterosphærii* cœnobiis legem dispositionis cellularum, ut fere fit, ad explicanda cœnobia pervenire in omnibus casibus, certissime puto; sicut per analogiam in *Protococcaceis* cœnobio pluricellulari sphærico (*Cœlastrum* et *Sorastrum*), quarum cœnobia abnormiter disposita rarissime observari possunt.

---

* ἀστήρ, stella; σφαῖρα, globus.

Omnium speciminum observatorum cellulæ erant vacuæ, veluti sæpe observamus in *Pediastris* majoribus.

CHLAMYDOCOCCUS, sp.

C. cellulis globosis vel ellipticis, magnitudine paulo diversis, cytioplasmate et subhomogeneo et granuloso (granulis amylaceis dense repleto), in statu progressiore corpusculis sphæricis majoribus colore intensive luteo-purpurascente binis ad quinis instructo (cellulis filialibus zoogonidiis), cytiodermate hyalino crassissimo plurilamelloso (interdum unilateraliter incrassato). Cellular. diam. (ante divis.) 0·0278–0·0393 millim., diam. post divisionem 0·0196–0·0224 millim.

Hab. in foliis *Fontinalis* spec.

Huius plantulæ vera natura initio mihi erat aliquid dubia. In cellularum plurimarum magnitudine, cellulas filias non procreantium, cytioplasmatis colore, cytiodermatis structura valde consentiens cum *Chroococco aureo*, nihilominus inveniuntur cellulæ singulæ cytioplasmatis valde diversa structura a *Chroococcis*. Sed post observatis cellulis minoribus (zoogonidiis) sine dubio incohærentia organica cum cellulis majoribus *Chroococcoideis*, hujus plantulæ positio in systemate est constituta. Quæ cellulæ forma late pyriformi, polo subito angustato, cytiodermate tenui, cytioplasmate homogeneo colore intensive purpureo erant inventæ in consortio cellularum majorum cytioplasmate vacuarum. In singulis cellulis sunt inclusæ complures cellulæ filiales sphæricæ, colore luteo-purpureo, aliis cellulis sunt corpuscula bina (interdum singulum). Nonullarum cellularum cytioplasma densissime est repletum corpusculis amylaceis. *Chlamydococci* species duæ cognitæ differunt cytiodermate multo tenuiore non lamelloso.

STAURASTRUM KERGUELENENSE, sp. n.

Semicellulæ a latere late trapezicæ angulis longe productis, margine terminali subrecto, a vertice visæ æqualiter trigonæ, marginibus lateralibus rectis, angulis in cornulum rectum margine regulariter crenulatum longe productis, cornulis summis bispinosis, cytiodermate lævi seriebus tribus verrucularum marginibus semicellulæ parallelis et in cornulis excurrentibus ornato; isthmi latitudo quinta pars cellulæ latitudinis. Latit. cellulæ 0·1038 millim., isthmi latitudo 0·0146 millim.

Observavi tantum specimina duo in massa algarum muscis aquaticis adhærentia.

S. gracili, Ralfs, simile semicellularum forma, sed differt dimensionibus plusquam duplo majoribus, cornulis multo gracilioribus. E familiæ pulcherrimæ Desmidiacearum speciebus numerosissimis sunt reperta tantum inter algas Kerguelenenses *Cosmaria* duo, hoc *Staurastrum*, *Palmoglœa* spec., et *Euastrum binale*, var.

OLPIDIUM CAUDATUM, sp. n.

O. cellulis sphæricis sine radiculis substrato viventi insidentibus, in polo processu singulo spiniformi cellulæ diametrum subæquante postremo aperto instructis; cytiodermate distincto subcrasso, cytioplasmate dense granuloso. Diam. cellular. 0·0112–0·013 millim.

Hab. in *Schizosiphontis kerguelenensis* trichomatibus.

O. ampullaceum (*Chytridium ampullaceum*, A. Braun, 'Ber. d. Berlin. Akad.' 1855, p. 66; Rabenhorst, 'Fl. Europ. Alg.' ii. p. 282) est distinctum ab hoc *Olpidio* dimensionibus duplo minoribus (0·0064 millim.).

CHYTRIDIUM PYRIFORME, sp. n.

C. cellulis zoogonidiis nondum egressis operculo se apertis ovato-pyriformibus, basi sensim angustata, in radiculam in substrato vivente radicantem prolongatis, diametro transversali dimidio diametri longitudinalis angustiore, cytioplasmate dense subtiliter granuloso, cytiodermate distincto dupliciter striato; cellulis zoogonidiis egressis subcylindricis usque subcuneatis; operculo transversaliter a cellula sejungente subhemisphærico apice rotundato (non acuminato); radicula usque tertiam partem diametri longitudinalis cellulæ æquante, in medio plus minusve incrassato apiculo prolongato deorsum verso. Diam. transversal. cellulæ 0·013–0·0168 millim., diam. longitudinalis cellulæ 0·0258–0·0278 millim.

Hab. in *Vaucheriæ sessilis* ac *geminatæ* cellulis.

A *Chytridiis* hucusque cognitis proximum in cellularum forma *C. Olla*, A. Braun (Verjüng. p. 198; Ber. Berlin. Akad. 1855, p. 380; Rabenh. Fl. Europ. Alg. ii. p. 277), quod *Chytridium* distinguitur cellulis latioribus operculo obtuse umbilicato; *C. acuminatum* et *C. brevipes*, Al. Braun, sunt distincta operculis acuminatis.

In omnibus *Vaucheriæ* cellulis quæ portaverunt plantulas parasiticas, sunt observatæ prolongationes utriculiformes dense positæ e *Vaucheriæ* cellula egressæ. Parasita invenitur plerumque in iisdem locis *Vaucheriæ* cellulæ infectæ, ubi sunt evolutæ hæ prolongationes utriculiformes. In his locis abnormiter transmutatis apparent parietes intercalares quæ separant lumen transmutatum a cellulæ cetero lumine. Certissime adducta est transmutatio abnormis *Vaucheriæ* a plantulis parasiticis. Complures casus hucusque sunt observati in quibus efferuntur transmutationes morphologicæ plantarum altiorum per plantulas parasiticas unicellulares. Singula fila *Vaucheriæ* abnormiter transmutatæ observavi, quibus desunt *Chytoidii* cellulæ, sed in cytioplasmate *Vaucheriæ* sunt impositæ cellulæ sphæricæ magnitudine varia manifesto alienæ *Vaucheriæ* cellulæ. Utrum aliqua connexio sit genetica inter *Chytoidii* cellulas pyriformes *Vaucheriæ* insidentes et cellulas entophyticas, an non, incertum est.

MICROTHAMNION CLADOPHOROIDES, sp. n.

M. e maximis, fruticulosum, filis solitariis erectis regulariter ramosis, radiculis singulis contortis in substrato (algis viventibus) insidentibus; ramulis erecto-patentibus, attenuatis, unilateraliter dispositis (in speciminibus minoribus) aut verticillatim dispositis (in speciminibus majoribus); cellulis fili primarii apicem versus paulo incrassatis diametro 4plo–6plo longioribus; cellulis ramulorum in basi paulo constrictis diametro 10plo–20plo longioribus; cytioplasmate omnium cellularum subhomogeneo colore pallide luteo-olivaceo, granulis singulis dispersis instructo. Fili primarii cellular. latit. 0·0056 millim., ramulorum cellulorum latit. 0·0028–0·0041 millim.; plantulæ altitudo usque 0·556 millim.

Hab. in *Lyngbyæ majoris* Kütz. formæ trichomatibus et in *Chroococci* spec. cellulis radiculis brevissimis affixum.

Hæc plantula elegantissima *Cladophoris* singulis in habitu haud dissimilis, sed sat distincta a *Cladophoris* cytioplasmate subhomogeneo ac dimensionibus minimis, ad *Microthamnia* spectat, quibuscum consentit in cytioplasmatis structura. Generis specierum trium hucusque cognitarum nulla aliqua similitudine consentit cum plantula insulæ Kerguelenensis.

STIGEOCLONIUM HOOKERI, sp. n.

S. læte viride, parasiticum, cæspitulos chætophoræformes basi radicante formans; filis ætate provectiore inferne nudis et subintegris, superne ramosissimis, basi radiculis anastomosantibus instructis, ramis spicatis (plerumque) integerrimis, approximatis, stricte erectis; cellulis filorum primariorum hyalinis cytioplasmate contracto (in statu vegeto?) diametro transversali (inferiorum) duplo vel triplo longioribus et æqualibus (superiorum), cellulis ramorum tumidis, omnibus in sporangia zoogonidia evolventia transmutatis diametro æqualibus et dimidio brevioribus. Diam. cellular. filorum primar. 0·0112–0·013 millim., diam. ramorum sporidiiferorum 0·0084–0·0112 millim.; altitudo plantulæ 1–1·5 millim.

Hab. in *Nitellæ Hookeri* cellulis et in foliis *Fontinalis.*

Hoc *Stigeoclonium* elegantissimum cum *S. debili* et *uniformi* Kütz. (Tab. Phycol. iii. tab. 3) aliqua similitudine consentit. Primum differt ramulis longioribus longius distantibus, non fasciculato-racemosis, secundum ramificationem verticilliformem caulis primarii. Hæc species tres cum *S. gracili*, Kütz., subspecies formant speciei unius typicæ.

STIGEOCLONIUM SUBTILE, sp. n.

S. minutissimum, parasiticum, ex filis sterilescentibus tenuioribus longioribus integerrimis erectis e filis procumbentibus dense intertextis crassioribus ortis formatum; cellulis ramulorum erectorum tenuioribus diametro 4plo–8plo longioribus, cellulis filorum procumbentium latioribus diametro subæqualibus; filis propagativis paulo crassioribus, cellulis zoogonidia procreantibus cellulis filorum sterilescentium multo brevioribus, subquadraticis arctissime conjunctis. Diam. filorum erectorum 0·0048–0·0056 millim.

Hab. in *Fontinalis* foliis, in *Nitellæ* et *Vaucheriæ* cellulis, et in *Schizosiphontis kerguelenensis* trichomatibus.

Hoc *Stigeoclonium* ramulis prolongatis tenuissimis flagelliformibus erectis, ex ramulis crassioribus ortis, aliqua similitudine consentit cum *S. setigero*, Kütz. (Tab. Phyc. iii. tab. 5), quod distinguitur cæspitulis multo majoribus fluctuantibus (usque tres lineas longis). Cæspituli tantum fila propagativa procreantes haberi possunt pro specie propria. In singulis speciminibus plantulæ inveniuntur et fila sterilescentia et fila propagativa. Ulteriora paulo crassiora sed breviora sæpe inveniuntur ex uno ramulo evoluta cum filis sterilescentibus. Cæspitulos quoqne singulos in *Hormosiphontis*, sp. n., physeumate crescentes una cum *Choreoclonii procumbentis*, gen. nov., cæspitulis observavi; in his plantularum duarum infimæ partes adeo sunt inter se coalitæ ut plantulas duas valde diversas in cohæsione genetica putare possis.

CHOREOCLONIUM*, gen. nov. Chætophorearum.

Plantula parasitica ex filis ramosis procumbentibus densius aut laxius intricatis substrato dense adpressis interdum parenchymatice inter se conjunctis formata; cellulæ rectangulares usque quadraticæ; propagatio ?

Synon. Gen. s. n. in Reinsch, 'Contributiones,' p. 76, tab. iv. (*Chloroph.*), descriptum et delineatum.

Genus *Stigeoclonio* proximum.

CHOREOCLONIUM PROCUMBENS, sp. unica.

Cellular. diam. 0·0028–0·0041 millim., cellular. longit. 0·0112–0·0224 millim.

Hab. in foliis *Fontinalis* et in *Nitellæ Hookeri*, sp. n., cellulis.

Hanc plantulam primo observavi anno 1872 in Germania in plantis aquaticis (*Hottonia*, *Utricularia*) crescentem, deinde in compluribus formis variis locis Germaniæ. In 'Contributionibus' meis formas varias in uno genere conjunctas sine nomine recepi; post plantulam Kerguelenensem inventam nimirum dubitare possum de identitate plantularum e locis duobus remotissimis.

---

* χορέω, expando; κλόνις, clunis.

DRAPARNALDIA SUBTILIS, sp. n.

D. filis ramisque primariis hyalinis, ramis e basi repetito dichotome ramosissimis, ramulis furcatis acutis plerumque in pilum hyalinum ex cellulis compluribus exstitutum longe productis; cellulis infimis fili primarii diametro æqualibus cytiodermate crasso lamelloso, cytioplasmate subhomogeneo subtilissime granulato, cellulis superioribus diametro usque duplo longioribus; cellulis ramulorum diametro usque triplo longioribus, cytioplasmate dense granuloso. Diam. fili primarii 0·0168–0·0232 millim., diam. ramulorum 0·0056–0·0084 millim.; plantulæ altitudo 1–2 millim.

In *Vaucheriæ* cellulis et in muscis aquaticis in plantulis dispersis radiculis numerosis radicantibus. Hæc plantula elegans, tantummodo in speciminibus paucis observata, differt a ceteris *Draparnaldiis* et magnitudine et loco natali.

ZYGOGONIUM TENUISSIMUM, sp. n.

Z. filis tenuissimis cellulis diametro duplo longioribus (et paulo minus), regulariter rectangularibus, cytiodermate subcrasso homogeneo hyalino; cytioplasmate contracto colore luteo-viridi granulis majoribus instructo. Diam. cellular. 0·0068–0·0084 millim.

In singulis filis inter *Scytonema castaneum* dispersis. "Near Vulcan Cove."

Differt a *Z. delicatulo* et *Z. salino* cellulis longioribus, a *Z. gracili* et *Z. Ralfsii* cellulis brevioribus, ab omnibus *Zygogoniis* autem filis multo tenuioribus.

GONGROSIRA PACHYDERMA, sp. n.

G. aquatica, parasitica, pulvinulos ex cellulis absque ordine (rarius in modo parenchymatis) cohærentibus formans, cellulis irregulariter sphæricis usque ellipsoideis (omnibus? fructiferis), cytioplasmate granuloso colore pallide luteo-viridi, cytiodermate crassissimo, plurilamelloso (usque cellulæ diametri transversalis dimidio æquali). Diam. cellular. (cytioderm. incl.) 0·039–0·051 millim.; cytiodermatis crassitudo 0·0041–0·0056 millim.

Hab. in foliis *Fontinalis*.

Gongrosira De Baryana, Rabenh. (Fl. Europ. Alg. ii. p. 388; Alg. Europ. Nro. 223), proxima species (in lapidibus lignisque pr. Francofurtum ad Oderam, *Itzigsohn et De Bary*) differt cellulis minoribus in filos subramosos dispositis, cytiodermate tenuiore.

NITELLA HOOKERI, sp. n.

N. debilis, minutula, usque biuncialis, dioica et monoica? ramis numerosis adscendentibus et ramis procumbentibus sparsis in nodulis radicantibus, omnibus ex nodulo singulo centrali ortis; ramis in nodulis incrassatis, verticillis 3is–4is; nodulis incrassatis floriferis, antheridiis sporangiis intermixtis; ramulis verticillorum integerrimis unicellularibus (interdum bi- rarius tricellularibus), apice late rotundato-obtuso; antheridiis et sporangiis sphæricis pedicellatis, in pedicello uni- et bicellulari positis; radiculis hyalinis numerosissimis fasciculatis ex nodulis ortis, sterilescentibus et stoloniferis in apice cellulas chlorophyllaceas procreantibus (primum statum axis juvenilis plantæ novæ). Crassitudo ramorum 0·14–0·22 millim.; diam. antherid. (evolutar.) 0·123 millim., diam. sporangii (in statu fœcundato) 0·0084 millim.

A formis minoribus *N. syncarpæ*, cum quibus hæc species elegans in habitu aliqua similitudine consentit, distinguitur: nodulis dense radicatis radiculis stoloniferis, ramulorum numero minore et ramulis obtusis late rotundatis.

In ampulla vitrea, in qua erant asservata in spiritu vini specimina, cum aliis algis aquæ dulcis tres aut quatuor plantulæ integræ erant immixtæ, omnes in statu florescente. Sporangium singulum observavi cellula centrali nucleo centrali distincto instituta, ex quo effici cogique potest, sporangium fœcundatum fuisse proximo ante tempus collectionis plantulæ. In antheridiis evolutis sunt inclusa antherozoidia bene evoluta. Quæ plantulæ sunt collectæ in hieme! 1874–75.

Observantur in singulis *Nitellæ* cellulis inter cytiodermatis lamellas jacentes cellulæ oblongæ colore luteo-fusco. De earum natura non potest dici aliquid certi nisi inquiruntur cellulæ aut in statu vivente aut in statu evolutionis progressiore. Quæ cellulæ a latere visæ sunt lenticulares, lamellæ interiores cytiodermatis *Nitellæ* sunt introrsum inflexæ; cellulæ horizontaliter visæ ambitu circulari sunt circumclusæ areola annulorum complurium concentricorum (in modo cellularum lignearum punctiformium Abietinearum).

Non est dubitandum has cellulas esse status peculiares evolutionis (juveniles?) algæ alicujus parasiticæ, verisimile ad *Chytridiaceas* spectantis. Nunquam sunt observata a me in speciminibus Europæis *Nitellæ* cellulæ parasiticæ huius generis.

RHIZOCLADIA*, gen. nov.

Gen. ad *Phæosporeas*, Thuret, spectans, *Pleurocladiæ*, Al. Braun, proximum.

---

* ῥίζα, radix; κλάδος, ramus.

Plantula ex strato procumbente ex filis ramosis substrato viventi dense adhærentibus formato et ex filis erectis ramosis fructiferis exstituta. Cellulæ filorum procumbentium primo rectangulares, ætate provectiore ovales usque lageniformes. Fila erecta singula aut bina ex cellulis filorum procumbentium orta, primo integra et ex cellulis æqualibus formata, demum subramosa et fructifera et ex cellulis inæqualibus formata. Trichosporangia in apice filorum erectorum ex 3is–5is cellulis quadraticis usque rectangularibus formata. Oosporangia ?

RHIZOCLADIA REPENS, sp. una.

Character idem. Longit. cellular. ex plic. filor. repent. 0·0097–0·0112 millim., latit. cellular. filor. erect. juvenil. 0·0041 millim., latit. trichosporang. 0·0058 millim.; plantulæ altitudo 0·056–0·089 millim.

Hab. in foliis *Fontinalis* et in cellulis *Nitellæ Hookeri.*

Hanc plantulam primo habui proximam algæ jam descriptæ et delineatæ in 'Contributionibus' meis (p. 76. tab. 14, *Chlorophyll.*), quæ planta est constituta ex filis ramosis procumbentibus. Ad hanc plantam, nunc inter *Chætophoraceas* positam, pertinentes formas postea inveni et ex filis procumbentibus et ex ramulis brevissimis erectis exstitutas. Sed per compages peculiares ex cellulis compluribus brevioribus supra positis exstitutas, sine dubiö trichosporangiis *Melanophycearum* proximas, hujus plantulæ positionem veram agnoscimus in systemate. Cellulæ singulæ dispersæ observantur in filis erectis singulis, ceteris cellulis crassiores et breviores (Oosporangia ?), quarum natura vera in statu viventi tantummodo agnosci potest. A genere *Pleurocladia*, unico aquæ dulcis hucusqus cognito, *Melanophycearum* organis peculiaribus fœcundationis præditarum, differt incrementi modo ac filorum structura.

BATRACHOSPERMUM MINUTISSIMUM, sp. n.

B. e minimis, oculis inarmatis vix conspicuum, parasiticum, filis integerrimis erectis singulis, aut perpaucis aggregatis, articulis inferioribus subcuneiformibus apice paulo incrassatis, cellulis corticalibus 4is–6is obtectis, superioribus nudis rectangularibus; ramulis verticillorum intëgerrimis (rarius singulis ramulis instructis), æqualibus, apicibus paulo angustatis ex cellulis 5is–7is exstitutis, apicem fili versus sensim decrescentibus, inferioribus articulorum longitudinem subæquantibus, summis duplo vel triplo longioribus; cellulis ramulorum rectangularibus usque subquadraticis, cytiodermate exteriore tenuissimo vix conspicuo, cytioplasmate subhomogeneo, colore obscure olivaceo-viridi; fructificatio? Diam. articulorum 0·0041–0·0056 millim., diam. ramulorum 0·0041 millim.; plantulæ altitudo 0·37–0·45 millim.

Hab. in *Nitellæ Hookeri* cellulis et in *Fontinalis* foliis, in filis singulis sparsis cum aliis algis (*Tolypothrix*, *Leptothrix*) intermixtis, rarius in cæspitulis parvulis.

B. tumidum, in *Chara vulgari* crescens (Reinsch, Contributiones, p. 69, tab. xliv. Rhodoph. fig. 1–5), a *Batrachospermis* hucusque cognitis proxima species, sed valde diversa, dimensionibus omnium partium multo majoribus (3–4 lineas longa), verticillorum ramulis numerosis repetito dichotome ramosis; in ramulorum cellularum forma aliqua similitudine consentit.

Report on the Fungi collected in Kerguelen Island by the Rev. A. E. Eaton during the stay of the Transit-of-Venus Expedition of 1874–5. By the Rev. M. J. Berkeley, M.A., F.L.S.

[Read May 4, 1876].

Until a few days before Midsummer no Fungi were seen in the vicinage of the chief Observatory of the English. The first species obtained was the common mushroom, one specimen of which was found on an island in Royal Sound by some officers from the 'Volage.' Towards the end of summer the other four species appeared in a few places upon the mainland. They were not by any means common.

Agaricus (Galera) kerguelenensis, *Berkeley, Journ. of Bot.* 1876.

Cæspitosus, fulvus; pileo e breviter campanulato convexo, lævi, carnuloso; margine tenui striato; stipite æquali, apice pulverulento-granulato; lamellis distantibus, ventricosis, adnatis.

Habitat. Amongst moss in a bog near Vulcan Cove. January 1875.

Cæspitose, attached by abundant mycelium. Pileus ⅓ inch across; stem nearly 1 inch high, ½ to ¾ line thick; principal gills about 12 in number, shortly but truly adnate, and not in the least degree decurrent.

It is far more fleshy than any variety of *A. hypnorum*, to which species it no doubt is closely allied; and while agreeing with *A. embolus* in the possession of comparatively few gills, it differs from this in the mode of their attachment.

Agaricus (Naucoria) furfuraceus, *P.*

Habitat. In the some bog as the preceding, at the same time.

Agaricus (Psalliota) campestris, *L.*

Habitat. On an island (Mussel Island) in Royal Sound, near Observatory Bay, 16th December, 1874. A solitary specimen.

Peziza (Sarcoscyphæ) kerguelenensis, *Berkeley in Hook. Antarct. Fl.* p. 451, tab. clxiv. iii. fig. 1, 3, 5; *Cooke, Myc.* fig. 134.

Habitat. Amongst dwarfed *Lepitinella plumosa* on wet ground very near the shore, growing in rings. Rare. One ring on an island in Swain's Bay, January, and another ring on the mainland, near Observatory Bay, February 1875*.

On the Lichens collected by Professor R. O. CUNNINGHAM in the Falkland Islands, Fuegia, Patagonia, and the Island of Chiloe during the Voyage of H.M.S. 'NASSAU,' 1867–9. By the Rev. J. M. CROMBIE, F.L.S.

[Read March 16, 1876.]

THE Lichen-flora of the region under notice, comprising the Falkland Islands, Fuegia, Patagonia, and the Island of Chiloe, has been made known to us in one or other of these tracts by the collections of various investigators, as Capt. King, Commerson, Dr. J. Hooker, and more especially M. Lechler. The present interesting collection, now in the Kew Herbarium, and recently submitted to me for examination, includes the great majority of the known lichens of Antarctic America, while at the same time it contains a very fair proportion of additions to Lichenological science. Unfortunately, as is too often the case in collections from the more remote countries, there are but very few saxicole lichens present, though there can be no doubt that these are frequent in the regions visited, and would well repay investigation. The short time, however, which is usually at the disposal of collectors, as well as the difficulties connected with transit, seem to form an almost insuperable obstacle to the collecting of many saxicole species, unless some special provision were made for this purpose, which would unquestionably be of the greatest advantage to this important branch of Cryptogamic Botany.

---

* [COPRINUS ATRAMENTARIUS, *Fr.*

Two or three specimens were found singly close to the edges of two of the lakes amongst the hills near Observatory Bay, in February 1875. Having been preserved in fluid and shaken to pieces during the voyage to England, they were not transmitted to Mr. Berkeley, but having compared them with the diagnosis in Berk. Outl. Brit. Fung. p. 177, when fresh, I have named them as above.—A. E. E.].

Family COLLEMACEI.

Tribe COLLEMEI.

LEPTOGIUM (STEPHANOPHORON) PHYLLOCARPUM (*Flk.*).
On trees. Ancud (Chiloe).

Very sparingly and infertile.

Family LICHENACEI.

Tribe SPHÆROPHOREI.

SPHÆROPHORON COMPRESSUM (*Sw.*).
On decayed trunks. Halt Bay, Port Grappler, Eden Harbour (west coast of Patagonia).

Fertile and apparently common.

S. AUSTRALE, *Laur.*
On decayed trunks. Huite (Chiloe), Port Otway (Cape Tres Montes).

Somewhat variable, but for the most part readily distinguishable from states of the preceding.

S. TENERUM, *Laur.*
On decayed trunks. Halt Bay, Port Otway, Otter Islands (west coast of Patagonia), Port Gallant (Strait of Magellan).

Rather variable in the slenderness of the primary branches.

S. T., f. COMPACTUM, *Cromb.* Thallus minor, ramis omnibus brevissimis gracillimis densissime intricatis; apotheciis minoribus vel fere minutis.
On decayed trunks. Port Gallant (fertile); Otter Islands (sterile).

In the specimens from the former, the thallus is tinged of a somewhat rusty red colour, while in those from the latter locality it is of a pure ivory white.

SPHÆROPHORON CORALLOIDES, *Pers.*
On the trunks of old trees. Punta Arenas (Strait of Magellan).

Apparently common, but infertile.

Tribe STEREOCAULEI.

STEREOCAULON RAMULOSUM (*Ach., Nyl.*).
On maritime rocks. Ancud (Chiloe); Eden Harbour, Island Harbour (W. coast of Patagonia).

Apparently abundant, and very variable in size.

S. R., var. MACROCARPUM (*Rich.*).
On maritime rocks. Island Harbour.

Sparingly gathered.

STEREOCAULON TOMENTOSUM, *Fr.*

On the ground. Punta Arenas (Sandy Point).

Apparently common and fertile.

S. T., var. MAGELLANICUM, *Fr.*

On earth-covered rocks. Fox Bay (West Falkland Islands).

Sterile.

Tribe CLADONIEI.

CLADONIA FIMBRIATA, *Hffm.*

Amongst mosses on the ground. Oazy Harbour (Strait of Magellan).

Sparingly and infertile.

F. COSTATA, *Flk.*

On the ground. Port Gallant.

Sterile.

CLADONIA GRACILIS, f. TRIPODA, *Cromb.*, est similis f. *hybridæ*, sed podetiis (altit. 2–4-pollicaris) vulgo tenuioribus (fertilibus autem crassioribus) et ter proliferis. Apothecia mediocria vel majuscula.

On the ground. Island Harbour (west coast of Patagonia).

Sparingly fertile.

C. CARNEOLA, *Fr.*

Amongst mosses on the ground. Sandy Point.

Very sparingly and infertile.

CLADONIA FURCATA, f. GRANDESCENS, *Nyl.* "Comparanda cum f. CORYMBOSA, sed major (altit. circiter 1–2 centimetrorum, crassit. podetiorum 1–2 millimetrorum), colore facile fuscescente (vel pro parte castaneo-fusco)."—*Nyl. in litt.* Thallus K —.

On the ground. Island Harbour.

Sparingly, and rarely fertile.

C. RACEMOSA (*Hffm.*).

Amongst mosses on the ground. Island Harbour.

Only a single small and sterile specimen seen.

C. LAMARKII (*Del.*), *Nyl.*

On the ground amongst mosses. Port Famine (Strait of Magellan).

A small, sterile, and otherwise not very characteristic specimen.

C. SQUAMOSA, *Hffm.*

On the ground. Sandy Point.

Not uncommon, but infertile.

C. SUBSQUAMOSA, f. NUDIOR, *Nyl.* Podetia saltem pro maxima parte subnuda.

On the ground. Port Otway.

Very sparingly and sterile.

CLADONIA MELANODES, *Nyl.*, sp. n. "Podetia nigra cornuta recta (altit. circiter bipollicaris vel circiter 4 centimetrorum, crassit. 1–2 millimetrorum), granulis albidis minutulis vel subpulvereis (K +, flaventibus) inspersa, basi squamulis parvis subcrenatis: apothecia non visa."—*Nyl. in litt.*

Inter muscos supra terram. Island Harbour.

Only a single specimen gathered. April 18th, 1868.

C. CORNUCOPIOIDES, f. INSIGNIS, *Nyl.*

On the ground. Port Famine, Sandy Point (Strait of Magellan).

A rather beautiful variety with larger podetia and large scarlet apothecia. This occurs also in Capt. King's collection in Hb. R. Brown.

CLADONIA PERCRASSATA, *Nyl.*, sp. n. "Thallus podetiis crassis firmis (crassit. 3–4 millim.), supra subacuminatis, pro magna parte (strato chondroideo) obscuris, conferte granuloso-squamulosis, squamulis albidis vel albido-lutescentibus subcrenatis. Microcarpa (apothecia rite evoluta non visa). E. stirpe *Cl. cornucopioidis* est."—*Nyl. in litt.*

On the ground. Eden Harbour.

Very sparingly. April 25th, 1868.

C. SPHÆRULIFERA (*Tayl.*).

On the ground. Puerto Bueno (west coast of Patagonia).

Only one specimen gathered, but sufficiently well fruited.

CLADINA RANGIFERINA (*L.*).

On the ground. Sandy Point.

Plentiful, but barren.

C. SYLVATICA (*L.*)

On the ground. Sandy Point.

Sterile.

C. S., var. PYCNOCLADA, *Pers.*

On the ground. Halt Bay, Eden Harbour.

Very sparingly fertile. Dr. Cunningham observes that it is sometimes a foot deep, forming large and beautiful masses on the surface of the damp ground.

CLADIA AGGREGATA (*Sw.*)

On the ground amongst mosses. Huite (Chiloe), Port Otway, Island Harbour.

Common and fertile. In the last of these localities it occurs also in a smaller and sterile condition, which, however, appears to be merely a juvenile state of the plant.

Tribe SIPHULEI.

SIPHULA RAMALINOIDES, *Nyl.*, sp. n. "Subsimilis *Siphulæ pteruloidi*, Nyl. Syn. i. p. 262, sed thallo lævi compresso lineari (latit. 1–2 millim.), in ramulis teretiusculis (crassit. 0·5 millim. vel tenuioribus) et apice globulo terminatis."—*Nyl. in litt.*

On the ground. Puerto Bueno.

Apparently rare and infertile. December 8th, 1868.

S. R., var. **COMATA**, *Nyl.* "Differt thallo ramulis dense intricatis comato."—*Nyl. in litt.*

On the ground. Mayne Harbour.

Rare and infertile. April 1st, 1869.

THAMNOLIA VERMICULARIS, var. **TAURICA** (*Wulf.*).

On the ground. Philip Bay (Fuegia).

Very sparingly gathered.

ENDOCENA, *Cromb.*, gen. nov.

Accedens ad *Siphulas*, facie fere conveniens, at thallo intus nonnihil cavo (vel parte axili medullæ cava in toto thallo).

ENDOCENA INFORMIS, *Cromb.* Thallus albido-lacteus subopacus irregulariter cylindraceus, podetiis constans suberectis aut subdecumbentibus (crassit. circiter 1 millim.), aggregatis, apicibus difformiter divisis; apothecia non visa. Thallus extus intusque K bene citrinoflavens; sectione thallus intus albus, strato gonidico non lente visibili, et solo sub microscopio gonidia parca sunt conspicua. Ob thallum cavum manifeste non *Pertusaria* nec *Lecanora*.

Supra terram muscosam. Port Grappler.

Sparingly. December 2nd, 1868. The podetia are only about ¼ inch in length.

Tribe USNEEI.

USNEA FLORIDA (*L.*).

On branches of trees. Port Melinka (South of Chiloe).

Typical and well fruited. Also at Huite—less typical and sterile.

U. fl., f. **DASYCERA**, *Nyl.* Thallus lutescens dense ramulosus, ramulis conferte fibrillosis, fibrillis brevioribus.

On branches of trees. Huite (Chiloe).

Very sparingly and infertile.

U. CERATINA, *Ach.*

On branches of trees. Port Otway (west coast of Patagonia).

Sterile.

U. LACUNOSA, *Willd.*
On trunks of trees. San-Isideo Point (Fuegia).
Sparingly and infertile.

NEUROPOGON MELAXANTHUS (*Ach.*).
On rocks. East Falkland Islands.
Plentiful and fertile.

N. M., f. SOREDIIFER, *Cromb.*
On maritime rocks. San-Isideo Point (Fuegia).
Sterile.

CHLOREA POEPPIGGII (*Nees et Flot.*).
On the branches of trees. Sandy Point.
Sparingly and very rarely fertile.

Tribe ALECTORIEI.

ALECTORIA OCHROLEUCA (*Ehrh.*).
On the ground. San-Isideo Point, Philip Bay (Fuegia).
Sparingly and infertile.

Tribe RAMALINEI.

RAMALINA LINEARIS (*Sw.*).
On maritime rocks. East Falkland Islands.
Apparently common and fertile, varying somewhat in the breadth of the laciniæ.

R. SUBFRAXINEA, *Nyl.*
On the trunks of oaks. Eden Harbour (west coast of Patagonia).
Not unfrequent.

R. SEPIACEA, * TEREBRATA, *Tayl.*
On maritime rocks. St.-Nicolas Bay (south coast of Patagonia).
Common, but without apothecia.

Tribe CETRARIEI.

CETRARIA ACULEATA, var. ACANTHELLA, *Ach.*
On the ground. Philip Bay (Fuegia).
Sterile.

C. EPIPHORELLA, *Nyl.* (= *Lechl. Pl. Magell.* No. 1001.) "Thallus nitidus inermis gracilentus, hinc inde ramulis fruticulose divisis insignitus, truncis ipsis longitudinaliter subcanaliculatis. Facile propria species."—*Nyl. in litt.*
On the ground amongst mosses. Sandy Point.
Infertile. March 14th, 1867.

PLATYSMA ULOPHYLLUM (*Ach.*).
On the trunks of trees. Sandy Point.

Very sparingly and infertile, associated with other lichens.

PLATYSMA GLAUCUM, f. CORALLOIDEA (*Wallr.*).
On decayed trunks amongst mosses. Sandy Point.

Sterile.

Tribe PARMELIEI.

PARMELIA REVOLUTA (*Flk.*).
On the bark of trees. Puerto Bueno.

Very sparingly and infertile, and otherwise atypical. Thallus Ca Cl +.

P. PERUVIANA, *Nyl.* (= *Lechl. Pl. Per.* no. 2727).
On the bark of trees. Eden Harbour.

Very sparingly and sterile. Thallus K ±, Ca Cl = .

P. CUNNINGHAMI, *Cromb.*, sp. n. Similis *Parmeliæ saxatili*, sed thallus crasse imbricatus, lævis, apicibus laciniarum sorediosis. Apothecia non visa. The soredia are of a reddish colour in the specimens seen; but this is evidently only accidental.
On the trunks of old trees. Island Harbour.

Very sparingly gathered and infertile. April 16th, 1868.

P. DELISELLA, *Nyl.*, sp. n. "Est quasi *P. prolixa* (f. *Delisei*) minor, laciniis adnatis sæpissime magis discretis (latit. circiter 0·4–1 millim.), sporis minoribus (longit. 0·008–0·009 millim., crassit. 0·005–0·006 millim.). Spermatia bifusiformia, longit. circiter 0·0045 millim., crassit. vix 0·0005 millim. Thallus K =, Ca Cl ±, tum medulla obsolete erythrinose nonnihil tincta."—*Nyl. in litt.*
Ad saxa schistosa. River Gallegos (east coast of Patagonia).

Very sparingly gathered. February 1869.

P. LUGUBRIS (*Pers.*).
On trunks of trees. Sandy Point, fertile; Port Grappler, Philip Bay, infertile.

Spores 0·007–0·009 millim. long, 0·005–0·006 millim. thick. Spermatia bifusiform, 0·0045 millim. long, 0·0005 millim. thick.

P. CINCINNATA (*Ach.*).
On dead twigs and trunks of trees. Halt Bay, Port Gallant.

Sparingly and infertile.

P. DISPORA, *Nyl.*, sp. n. "Similis *Parmeliæ cincinnatæ*, Ach., sed sæpe nonnihil major, thallo albido, sporis binis majoribus (longit. 0·052–0·064 millim., crassit. 0·027–0·044 millim.). Receptaculum apotheciorum (latit. 3–8 millim.) rugosum. Spermatia acicularia (vel vix subbifusiformia), longit. 0·005 millim., crassit. 0·0005 millim."—*Nyl. in litt.*

On trunks of trees. Fortune Bay.

Apparently not unfrequent. December 16th, 1868.

Tribe STICTEI.

STICTINA INTRICATA, f. THOUARSII (*Del.*).

On old trees. Halt Bay.

Sparingly and infertile.

S. FAVEOLATA (*Del.*).

On trunks of trees. Huite (Chiloe), Halt Bay, Port Gallant (Strait of Magellan).

Apparently common, though several of the specimens gathered are sterile.

S. F., * CERVICORNIS, *Flot.*

On trees. Port Otway (Cape Tres Montes).

Sparingly and not very fertile.

S. CARPOLOMA (*Del.*).

On the trunks of trees. Sandy Point.

Not unfrequent, and usually fertile.

S. HIRSUTA *Nyl.*

On the trunks of trees. Port Famine (Strait of Magellan).

Perhaps not uncommon.

S. QUERCIZANS (*Mich.*), *Nyl.*

On the trunks of trees. Huite (Chiloe), Port Churruca (Island of Desolation, Fuegia),

Sparingly and sterile.

S. FULIGINOSA (*Dcks.*).

On trees. Ancud (Chiloe).

Only a single barren fragment seen.

S. F., f. FIRMIOR, *Cromb.* Thallus luridus crassior firmior. On decayed trunks. Sandy Point.

Very sparingly and infertile. The specimens seem referable to the present rather than to any other allied species.

STICTINA FILICINA (*Ach.* pro. p.), *Nyl.*

On the trunks of trees. Huite (Chiloe), Eden Harbour, Port Grappler (west coast of Patagonia).

Apparently not unfrequent, and fertile.

S. F., f. LATISSIMA, *Nyl.* Thallus major, latit. circiter tripollicaris.

On trunks. Tuesday Bay (Strait of Magellan).

Sparingly gathered. This form approaches somewhat in size to *Sticta latifrons*, Rich.

STICTA LINEARILOBA (*Mnt.*).

On trees. Port Otway.

Only a single specimen gathered, and that but sparingly fruited.

S. DAMÆCORNIS (*Sw.*).

On trees. Port Otway.

Very sparingly gathered, and approaching to f. *canariensis* (Del.).

S. ENDOCHRYSEA (*Del.*).

On trunks of trees. Port Otway.

Very sparingly gathered.

S. E., var. VACCINA (*Mnt.*).

On trees. Sandy Point.

Probably not uncommon.

STICTA NITIDA (*Tayl.*).

On trunks of trees. Ancud, Huite (Chiloe).

Plentiful and fertile, varying somewhat in the length and breadth of the laciniæ.

S. URVILLEI, *Del.*, var. **FLAVICANS** (*Hook.*)

On trunks of trees. Huite (Chiloe), Fortune Bay (west coast of Patagonia).

Sparingly and infertile.

S. U, * ORYGMÆOIDES, *Nyl.*

On trunks of trees. Ancud (Chiloe), Port Grappler (Strait of Magellan).

Apparently common and fertile.

S. ORYGMÆA, *Ach.*

On trunks of trees. Sholl Bay (Smyth's Channel, west coast of Patagonia).

Only very sparingly gathered.

S. OBVOLUTA, *Ach.*, *Nyl.*

On trunks of trees. Sandy Point, Port Famine (Strait of Magellan).

Probably not uncommon.

S. FOSSULATA, *Duf.*, var. **PHYSCIOSPORA**, *Nyl.*

On trunks of trees. Eden Harbour (west coast of Patagonia).

Very sparingly, but fertile.

S. FREYCINETTII, *Del.*

On trunks of trees. Port Famine.

Very sparingly, and with apothecia not well developed.

Tribe PELTIGEREI.

NEPHROMA ANTARCTICUM (*Jacq.*).

On the trunks of old trees. Port Famine, Port Gallant (Strait of Magellan); Port Otway (Cape Tres Montes).

Plentiful. The specimens from the first of these localities are very large and beautiful, while those from the last are smaller and may be referred to a f. *minor*, which may thus be characterized:—"thallus smaller, more divided; apothecia smaller."

N. ANALOGICUM, *Nyl.*, sp. n. "Subsimile *Nephromio lusitanico* (Schær.), thallo etiam intus flavo (K +, chrysophanice reagente), sed nonnihil firmiore et receptaculo apotheciorum areolato, insculpto (sicut in *Nephromio subtomentello*, Nyl.)"—*Nyl. in litt.*

On trees. Port Grappler, Otter Islands.

Sparingly gathered. March 16th, 1868.

NEPHROMIUM PLUMBEUM (*Mnt.*).

Amongst mosses on the trunks of trees. Ancud (Chiloe).

Very sparingly, and only a single specimen gathered.

PELTIGERA RUFESCENS, *Hffm.*

Amongst mosses on the ground. Sandy Point.

Infertile.

Tribe PHYSCIEI.

PHYSCIA PARIETINA, var. **POLYCARPON**, *Flk.*

On branches of trees. Direction Hills (S.E. coast of Patagonia).

Probably not uncommon.

P. P., var. **ECTANEA**, *Ach.*

On stones. Huite (Chiloe).

Only a single specimen gathered, but "common on stones at high water-mark."

PHYSCIA SPECIOSA, *Wulf.*

Apparently on rocks. Eden Harbour (west coast of Patagonia).

Very sparingly and infertile, a sorediate state.

Tribe LECANOREI.

PANNARIA PHOLIDOTA, *Mnt.*

On decayed stumps of trees. Port Gallant.

Very sparingly and infertile; an obscure state.

P. SUBCINCINNATA, *Nyl.*, n. sp. "Thallus albidus opacus, fere parmelioideus, subimbricato-lobatus (crassit. circiter 0·25 millim.), ambitu substellatim nonnihil radians lobis planis crenato-incisis non substrato affixis, subtus niger, nudus; apothecia fusco-nigricantia (latit. 1·5 millim. vel minora) lecanorino-parmelioidea, margine receptaculari integro demum fusco-nigricante; sporæ 8næ incolores ellipsoideæ simplices, longit. 0·012–0·014 millim., crassit 0·006–0·007 millim., paraphyses mediocres, hypothecium nonnihil rufescens. Iodo gelatina hymenialis cærulescens, dein vinose fulvescens. Quodammodo facie in memoriam revocat *Parmeliam cincinnatam,* Ach., unde nomen."—*Nyl. in litt.*

Ad saxa granitica. On a hill, Swallow Bay (Fuegia).

Very sparingly gathered. December 30th, 1868.

Erioderma polycarpum, *Fée.*

Amongst mosses on trees. Port Otway (Cape Tres Montes).

Very sparingly gathered, and with scanty apothecia.

Psoroma sphinctrinum (*Mnt.*).

On the bark of trees. Sandy Point.

Apparently not uncommon, and well fruited.

P. hispidulum, *Nyl.*

On the bark of trees. Port Grappler, Halt Bay.

Only sparingly gathered.

Lecanora (Placopsis) gelida (*L.*).

On granite rocks. New Harbour (Fuegia).

Sparingly, and approaching to f. *vitellina,* Babbing, in Hook. Fl. Antarct.

L. (P.) g., f. terricola. Thallus thickish, subgranulated except at the circumference; apothecia numerous; spores 0·018–0·020 millim. long, 0·011–0·014 millim. thick.

On the ground, "forming rather large patches." Huite (Chiloe).

Apparently not uncommon, though only a very few specimens gathered.

Lecanora endochrysodes, *Nyl.,* sp. n. "Thallus cinereus tenuis lævigatus rimosus, intus croceo-lutescens (et ibi K purpurascens); apothecia nigricantia innata plana lecideoidea (latit. 0·5–0·8 millim.) margine tenui fusco-nigro vel nigro, intus albida; sporæ 8næ fuscæ ellipsoideæ biloculari-uniseptatæ, longit. 0·017–0·025 millim., crassit. 0·009–0·011 millim., epithecium fuscum, hypothecium incolor. Iodo gelatina hymenialis cærulescens dein obscure violaceo-fulvescens.

"Species affinis *Lecanoræ conioptæ,* Nyl., sed facillime dignoscitur jam medulla chrysophanica. Sterigmata pauciarticulata; spermatia breviter bacillaria, longit. 0·0030–0·0035 millim., crassit. vix 0·0010 millim."—*Nyl. in litt.*

Ad saxa granitica. On a hill, Swallow Bay (Fuegia).

Very sparingly, only a single small specimen being gathered, December 30th, 1868.

LECANORA PUNICEA, *Ach.*

On the bark of trees. Sandy Point (Strait of Magellan).

Sparingly gathered.

Tribe PERTUSARIEI.

PERTUSARIA COCCOPHORA (*Mnt.*).

On dead stumps and stems of trees. Columbine Cove (west coast of Patagonia).

Apparently not uncommon, but very rarely fertile. Apothecia crowded; spores 8næ, 0·048–0·062 millim. long, 0·027–0·034 millim. thick.

Tribe THELOTREMEI.

THELOTREMA SUBTILE, *Tuck.*

On the bark of trees. Sandy Point.

Only two small fragments gathered.

Tribe LECIDEEI.

LECIDEA SPADICOMMA, *Nyl.*, sp. n. "Thallus albidus vel albido-ochraceus, lævigatus rimulosus (crassit. 0·5 millim.); apothecia spadiceo-fusca plana (latit. 1·2–2·4 millim.), immarginata, a thallo circumscissa (ita spurie lecanorina), intus pallida et linea infera fusca; sporæ 8næ, incolores, ellipsoideæ, longit. 0·024–0·027 millim., crassit. 0·011–0·014 millim., paraphyses graciles, epithecium lutescens. hypothecium sat tenuiter infuscatum. Iodo gelatina hymenialis intensive cærulescens, dein thecæ sordide violacee tinctæ.

"Est species elegans e stirpe *Lecideæ contiguæ*, faciei alienæ. Spermatia acicularia recta longa, longit. 0·020–0·026 millim., crassit. 0·0005–0·0006 millim."—*Nyl. in litt.*

Ad saxa granitica. In the bed of a stream, near Eden Harbour (west coast of Patagonia).

Sparingly. April 1868.

Tribe GRAPHIDEI.

STIGMATIDIUM GRAPHIDIODES, *Cromb.*, sp. n. Thallus albido-ochraceus effusus tenuis rimosus: apothecia nigra linearia (latit. 0·5 millim., longit. 1–2 millim.), epithecio nonnihil concaviusculo impresso (nigro), intus obscura: sporæ non visæ, saltem rite evolutæ.

Supra saxa granitica. On a hill, Swallow Bay (Fuegia).

December 30th, 1868. Very sparingly.

CHIODECTON CEREBRIFORME, *Mnt.*

n maritime rocks. Otter Islands (west coast of Patagonia).

Very sparingly, and the apothecia rarely rightly developed.

Tribe PYRENOCARPEI.

VERRUCARIA DERMOPLACA, *Nyl.*, sp. n. "Thallus castaneus lævi tenuis, passim rhagadiose diffracto-rimosus, rhagadibus nigricantibus; apothecia extus nigra convexa prominula (latit. hoc operculo ostiolari 0·2 millim. vel minore), pyrenio ceteroquin incolori innata; sporæ 8næ incolores ellipsoideæ, longit. 0·011–0·012 millim., crassit. 0·006–0·007 millim. Iodo gelatina hymenialis vinose rubescens.

"In stirpe *V. mucosæ* species omnino peculiaris."—*Nyl. in litt.*

Ad saxa quartzosa maritima. Fox Bay (West Falkland Islands).

January, 1868. Sparingly gathered.

LEPRARIA LATEBRARUM, *Ach.*

Overspreading mosses on rocks. Peckett Harbour (east coast of Patagonia).

An undeveloped state of some lichen unknown.

It will be seen from the above enumeration that our knowledge of the lichen-flora of these South-American regions has thus been considerably enlarged by the researches of Professor Cunningham. Not only have several species been thus shown to have a much more southerly range than was previously known, but others, some of them very interesting novelties, have been brought to light. At the same time one cannot glance at the list of species collected without being at once struck by the paucity of representatives of some of the inferior genera—though there can be no doubt that many species of the *Lecanorei*, *Lecidei*, and *Pyrenocarpei*, both corticole and saxicole, are not infrequent in these regions. For the reasons, however, referred to above, these appear as sparingly in the present as they do in all former collections.

Identification of the Modern Copal Tree, *Trachylobium Hornemannianum*, with that which yielded the Copal or Animi now found in the earth on the East Coast of Africa, often where no Copal-yielding trees now exist. By JOHN KIRK, M.D., F.L.S. &c.

[Read April 20, 1876.]

ON my return from Zanzibar in 1873, I placed in the Museum at Kew a collection illustrating the history of the semifossil resin known in general trade as Zanzibar copal, and in the London market as Gum Animi. I need not advert now to the manner in which this is obtained, but, in sending to the Kew Museum an additional specimen containing a characteristic bijugate leaf, call attention to those already deposited by me in that Museum, where not only the leaf, but the flower-bud, the flower, the young ovary, and stamens, identical with those of the modern *Trachylobium Hornemannianum* are exhibited. From this we may fairly conclude that the tree now yielding an inferior gum is identical with that from which the Animi came in past ages, also that the difference in the two products, which affects not the market price alone, but the solubility of the gum in different reagents, and quality of the varnish so made, is due not to any difference in the tree or soil, or other conditions beyond age and exposure in the ground, where a molecular or chemical change has gone on, and a decomposition of the outer surface that makes it brittle after being treated with a caustic solution, and fall off to the husk, leaving the goose-skin appearance distinctive of the true ground-copal.

As I am not aware that attention has been yet called to the specimens which have been for some time exhibited in the Museum, I venture, in adding one more, to annex this short memorandum.

Contributions to the Botany of the Expedition of H.M.S. 'Challenger.'—Algæ, chiefly Polynesian. By Professor George Dickie, M.D., F.L.S.

[Read April 20, 1876.]

I. *Algæ collected by Mr. Moseley at Tongatabu, from the fringing reef (the rise and fall of tide about 6 feet).*

Dictyotaceæ.

Padina Pavonia, *L.*

Rhodomelaceæ.

Acanthophora Thierii, *Lamx.*

Laurenciaceæ.

Laurencia obtusa, *Huds.*

CORALLINACEÆ.

JANIA TENELLA, *Ktz.*

GELIDIACEÆ.

GELIDIUM RIGIDUM, *Vahl.*

HYPNEA HAMULOSA, *Turner.*

H. DIVARICATA, *Grev.*

CERAMIACEÆ.

CENTROCERAS MICRACANTHUM, *Ktz.*

SIPHONACEÆ.

CAULERPA BORYANA, *J. Ag.*

HALIMEDA OPUNTIA, *Lamx.*

H. TRIDENS, *Lamx.*

CODIUM TOMENTOSUM, *Huds.*

CHLORODESMIS COMOSA, *Harv.*

DASYCLADEÆ.

NEOMERIS DUMETOSA, *Lamx.*

ULVACEÆ.

ENTEROMORPHA COMPRESSA, *Grev.*, var. TRICHODES, *Ktz.*

CONFERVACEÆ.

CLADOPHORA MAURITIANA, *Ktz.*

CHÆTOMORPHA INFLATA, *Ktz.*?
Specimens imperfect, and recorded with doubt.

The following Algæ, attached to stones, were dredged ten miles north of Tongatabu, in 18 fathoms, the bottom being shell-sand with large Foraminifera:—

DICTYOTACEÆ.

DICTYOTA RADICANS, *Harv.*
Geog. distr. W. Australia.
The specimens are small, 2 to 3 inches in length.

Zonaria variegata, *Mont.*

Small, and delicate in texture.

Laurenciaceæ.

Laurencia filiformis, *Ag.*?

Very fragmentary, and therefore doubtful.

Siphonaceæ.

Caulerpa sedoides, *Ag.*

C. distichophylla, *Sonder.*

C. Boryana, *J. Ag.*

Halimeda Opuntia, *Lamx.*

H. macroloba, *Dne.*

Udotea Desfontainii, *Dne.*

A single example, an inch in height. Compared with authentic specimens from the Mediterranean, it appears to be identical.

Codium tomentosum, *Ag.*

C. spongiosum, *Harv.*

Geog. distr. W. and S. coasts of Australia.

Valoniaceæ.

Valonia fastigiata, *Harv.*

Microdictyon Agardhianum, *Dne.*

Dasycladeæ.

Acetabularia calyculus, *Quoy & Gaimard.*

Geog. distr. W. coast of Australia.

Ulvaceæ.

Ulva latissima, *Ag.*

Confervaceæ.

Cladophora Feredayi, *Harv.*?

The specimens seem to agree with the Tasmanian plant; but in this extensive and difficult genus a mark of doubt may often be added with propriety.

II. *Algæ collected by Mr. Moseley at the Admiralty Islands.*

FUCACEÆ.

SARGASSUM ILICIFOLIUM *, *Turner.*

S. HETEROCYSTUM, *Mont.*?

S. BERBERIFOLIUM, *J. Ag.*

S. AQUIFOLIUM, *Turner.*

S. GRACILE, *Ag.*?

S. VULGARE, *J. Ag.*

S. LANCEOLATUM, *J. Ag.*?

S. POLYCYSTUM, *Ag.*?

CYSTOPHYLLUM MURICATUM, *Turner.*

TURBINARIA VULGARIS, *J. Ag.*

DICTYOTACEÆ.

PADINA PAVONIA, *L.*

DICTYOTA DICHOTOMA, *Lamx.*

The specimens are rather imperfect, but appear to belong to a narrow variety.

ECTOCARPACEÆ.

ECTOCARPUS SORDIDUS, *Harv.*?

I refer Mr. Moseley's specimens, with some doubt, to the species briefly described in the 'Flora of Tasmania.'

SPHACELARIA FURCIGERA, *Ktz.*

Growing on species of *Sargassum*.

RHODOMELACEÆ.

ACANTHOPHORA THIERII, *Lamx.*

LAURENCIACEÆ.

LAURENCIA OBTUSA, *Huds.*

L. PAPILLOSA, *Forsk.*?

Fragments probably of this species.

L. FORSTERI, *Grev.*

CORALLINACEÆ.

MASTOPHORA LAMOUROUXII, *Dne.*

AMPHIROA FRAGILISSIMA, *L.*

A. INVOLUTA, *Ktz.*

MELOBESIA VERRUCATA, *Lamx.*
On species of *Sargassum.*

JANIA RUBENS, *Lamx.*

SPHÆROCOCCOIDEÆ.

DESMIA AMBIGUA, *Grev.*

The plant is probably rare, there being only two small specimens, but sufficiently characteristic in structure &c.

GRACILARIA DACTYLOIDES, *Sonder.*

Broad and narrow varieties.

G. CONFERVOIDES, *L.*?, var. **CAPILLARIS**, *Ktz.*?

G. CORNICULATA, *R. Br.*

CORALLOPSIS AUSTRALASICA, *Sonder.*

The specimens are few and rather fragmentary, but sufficiently characteristic.

GELIDIACEÆ.

GELIDIUM RIGIDUM, *Vahl*?

HYPNEA DIVARICATA, *Grev.*

SIPHONACEÆ.

CAULERPA CLAVIFERA, *Ag.*

VALONIA FASTIGIATA, *Harv.*

HALIMEDA TRILOBA, *Dne.*

H. OPUNTIA, *Lamx.*

H. MACROLOBA, *Dne.*

The specimens of this genus are so imperfect that a mark of doubt is necessary in some cases.

III. *Algæ collected by Mr. Moseley at Banda Islands.*

FUCACEÆ.

SARGASSUM DENTIFOLIUM, *Turner.*

TURBINARIA VULGARIS, *J. Ag.*

SPHÆROCOCCOIDEÆ.

GRACILARIA EUCHEUMOIDES, *Harv.*

CORALLINACEÆ.

AMPHIROA INVOLUTA, *Ktz.*
Geog. distr. Cape G. Hope.

Rather fragmentary, but having the peculiar projections at the joints characteristic of the species.

HELMINTHOCLADIEÆ.

GALAXAURA MARGINATA, *Lamx.*

SIPHONACEÆ.

CODIUM TOMENTOSUM.

CONFERVACEÆ.

ULOTHRIX FUSCA, n. sp.?
Fusca, articulis diametro æqualibus, interdum parum brevioribus.
Diameter ·0004 of an inch.

Forming a thick layer about [the fumaroles of the crater of Gunong Api.

OSCILLARIACEÆ.

LEPTOTHRIX SYMPLOCOIDES, n. sp.
Trichomata tenuissima, continua, fusca, in fasciculos erectos basi confluentes concreta.
Diameter ·0002 of an inch.

Along with the last; both in the form of tough leather-like crusts. This, however, can be at once recognized by the peculiar pile on the free surface. Both these plants were mixed with siliceous incrustations. No adherent diatoms were found.

IV. *Algæ collected by Mr. Moseley from the Surface of the Sea among drift wood 70 miles north-east of the Ambernich River, New Guinea.*

FUCACEÆ.

SARGASSUM GRACILE, *J. Ag.*?

The specimens very imperfect, and therefore doubtful.

TURBINARIA VULGARIS, *J. Ag.*

V. *Algæ collected by Mr. Moseley off Raoul Island.*

FUCACEÆ.

CYSTOPHORA ELONGATA, n. sp.

Caule compresso plano, decomposito-pinnato, pinnis distichis, alternis, a margine egredientibus; pinnulis ultimis in rachi costata alternis, subsessilibus, lanceolatis, acutis; vesiculis subsessilibus magnis, ellipsoideis, apicibus acutis vel breviter apiculatis.

Mr. Moseley's specimens are 2 to 3 feet, or more, in length. The plant is allied to *C. platylobium*, Mert., but has a broader and much compressed stem: there are no costæ; the pinnules are lanceolate and much attenuated towards the base and apex; in *C. platylobium* the vesicles are spherical, and about the size of the fruit of *Prunus spinosa*; in the new species they are elliptic and an inch or more in length. "The specimens (a few bunches only, and infested with marine Crustacea &c.) were found floating thirty miles distant from Raoul Island, Kermadecs."

VI. *Algæ collected by Mr. Moseley at the Aru Islands.*

FUCACEÆ.

SARGASSUM DENTIFOLIUM, *Turner*?

Specimens very imperfect, and therefore recorded with doubt.

TURBINARIA VULGARIS, *J. Ag.*

HORMOPHYSA ARTICULATA, *Ktz.*

DICTYOTACEÆ.

PADINA PAVONIA, *L.*

DICTYOTA DICHOTOMA, *Huds.*

A narrow variety.

HYDROCLATHRUS CANCELLATUS, *Bory.*

CORALLINACEÆ.

AMPHIROA FRAGILISSIMA, *L.*

MELOBESIA VERRUCATA, *Lamx.*
Upon *Hormophysa* &c.

SIPHONACEÆ.

CAULERPA CLAVIFERA, *Ag.*

HALIMEDA MACROLOBA, *Dne.*

H. OPUNTIA, *Lamx.*

ULVACEÆ.

ENTEROMORPHA COMPRESSA, *Grev.*

VII. *Algæ collected by Mr. Moseley at Levuloa Harbour, Ovalau, Fiji.*

FUCACEÆ.

SARGASSUM VULGARE, *Ag.*
A variety apparently of this species.

TURBINARIA VULGARIS, *Ag.*

DICTYOTACEÆ.

PADINA PAVONIA, *L.*

HYDROCLATHRUS CANCELLATUS, *Bory.*

CORALLINACEÆ.

JANIA TENELLA, *Ktz.*
Upon *Turbinaria.*

HELMINTHOCLADIEÆ.

GALAXAURA RUGOSA, *Lamx.*

SIPHONACEÆ.

CAULERPA PLUMARIS, *Ag.*

CHLORODESMIS COMOSA, *Harv.*

CONFERVACEÆ.

CHÆTOMORPHA VALIDA, *H. f. & Harv.*

VIII. *Algæ collected by Mr. Moseley at the Philippines.*

"From the island of Mactan, opposite the harbour of Cebu, at low tide, on flats of coral-rock and coral, mostly dead, and covered more or less with sand. Between the patches of coral are stretches of soft mud on which several of the species were gathered."

FUCACEÆ.

SARGASSUM LATIFOLIUM, *Turner*.

S. GRACILE, *Ag*.

S. PARVIFOLIUM, *Turner*.

TURBINARIA VULGARIS, *Ag*.

DICTYOTACEÆ.

PADINA PAVONIA, *L*.

DICTYOTA DICHOTOMA, *Huds*.

CORALLINACEÆ.

AMPHIROA FRAGILISSIMA, *L*.

SPHÆROCOCCOIDEÆ.

GRACILARIA EUCHEUMOIDES, *Harv*.

GELIDIACEÆ.

GELIDIUM RIGIDUM, *Vahl*.

SIPHONACEÆ.

HALIMEDA OPUNTIA, *Lamx*.

H. MACROLOBA, *Dne*.

CODIUM TOMENTOSUM, *Stackh*.

C. ADHÆRENS, *Ag*.

DASYCLADEÆ.

POLYPHYSA SPICATA, *Ktz*.

This very peculiar Alga was first described and figured in 1861 by Professor Kützing from "Island of Balade, New Caledonia," where it was found by Vieillard.

ULVACEÆ.

ULVA RETICULATA, *Forsk*.

"The following were found at Zamboanga, Philippines, in 3 to 5 feet depth":—

FUCACEÆ.

SARGASSUM ILICIFOLIUM, *Turner*.

DICTYOTACEÆ.

PADINA PAVONIA, *L*.

LAURENCIACEÆ.

LAURENCIA PAPILLOSA, *Forsk.*

CHAMPIA COMPRESSA, *Harv.*

CORALLINACEÆ.

MELOBESIA FOLIACEA, *Ktz.?*

Very fragmentary, and therefore doubtful.

AMPHIROA CUMINGII, *Mont.?*

In the same condition as the last.

GELIDIACEÆ.

GELIDIUM RIGIDUM, *Vahl.*

HYPNEA SPINELLA, *Ag.*

HELMINTHOCLADIEÆ.

ACTINOTRICHIA RIGIDA, *Dne.*

SIPHONACEÆ.

CAULERPA PELTATA, *Lamx.*

C. CLAVIFERA, *Ag.*

HALIMEDA TUNA, *Lamx.*

VALONIACEÆ.

VALONIA UTRICULARIS, *Roth.*

DICTYOSPHÆRIA FAVULOSA, *Ag.*

ULVACEÆ.

ULVA RETICULATA, *Forsk.*

CONFERVACEÆ.

CLADOPHORA MAURITIANA, *Ktz.*

"The following were dredged in 10 fathoms off the island of Santa Cruz Major, opposite Zamboanga, Mindanao, Philippines. A few were got in shallower water":—

FUCACEÆ.

TURBINARIA VULGARIS, *Ag.*

DICTYOTACEÆ.

DICTYOTA LATA, *Lamx.*

RHODOMELACEÆ.

NEURYMENIA FRAXINIFOLIA, *Mertens.*

LAURENCIACEÆ.

LAURENCIA CONCINNA, *Mont.*

SPHÆROCOCCOIDEÆ.

BOTRYOCARPA PROLIFERA, *Grev.*

GRACILARIA DACTYLOIDES, *Sonder.*

SQUAMARIACEÆ.

PEYSSONNELIA RUBRA, *Grev.*

CRYPTONEMIACEÆ.

CHRYSYMENIA UVARIA, *Wulf.*

SIPHONACEÆ.

CAULERPA PLUMARIS, *Forsk.*

HALIMEDA OPUNTIA, *Lamx.*

VALONIACEÆ.

VALONIA FASTIGIATA, *Harv.*

ANADYOMENE FLABELLATA, *Lamx.*
Rather imperfect, but sufficiently characteristic.

OSCILLARIACEÆ.

LYNGBYA MAJUSCULA, *Harv.*

"The following were dredged in 18 fathoms off Gigantes Islands, Philippines, on the voyage from Manilla to Cebu":—

FUCACEÆ.

SARGASSUM BIFORME, *Turner.*
Fragments apparently of this species.

DICTYOTACEÆ.

ZONARIA VARIEGATA, *Lamx.*

CRYPTONEMIACEÆ.

GYMNOGONGRUS DILATATUS, *Turner*?

A few young and barren, apparently this species.

On the Plant yielding Latakia Tobacco.

By W. T. THISELTON DYER, M.A., B.Sc., F.L.S.

[Read April 20, 1876.]

DURING the course of last year my attention was attracted by a plant labelled "Latakia Tobacco," in the collection of Economic Plants at Kew. It supplied the materials for the figure published by Dr. Hooker in the Botanical Magazine, tab. 6207, under the name of *Nicotiana Tabacum*, var. *fruticosa*. I found, however, that there was some uncertainty as to whether it really represented the kind of tobacco cultivated at Latakia. The plant was raised from seed sent from Jamaica, and purporting to have been the produce of authentic Latakia seed received from Kew. There was, however, some possibility that in Jamaica this and other kinds of tobacco seed might have become confused together.

In all accounts which I have seen of the sources of tobacco, that of Latakia is stated to be produced by *Nicotiana rustica*[*], a species largely cultivated on the coast of the Mediterranean, and which undoubtedly yields *Turkish tobacco*. It is extremely distinct from *N. Tabacum*, and is known at once by its greenish yellow flowers with a rather short cylindrical corolla-tube and roundish obtuse limb-segments. Turkish tobacco, as imported into this country, consists of the leaves, which are comparatively small in size, ovate, and distinctly stalked. They are done up into small parcels, tied together by their stalks. Their colour is a pale brownish-yellow.

On examining the samples of Latakia tobacco in the Kew Museum, I was surprised to find that authentic commercial examples consisted of compressed bundles of short flowering shoots with flowers and capsules[†]. These are tied up with string (probably of goat's hair), and have a very dark and grimy appearance. I soaked a portion of one of these bundles in boiling water, and was able to obtain specimens sufficiently complete to ascertain with certainty that they did not belong to *Nicotiana rustica*, but to some variety of *N. Tabacum.*

---

[*] See Pereira's 'Materia Medica,' vol. ii. p. 1421; Flückiger and Hanbury's 'Pharmacologia,' p. 422.

[†] One of these bundles bore the note, "Guibili—finest, sown for Viceroy."

I applied to Mr. G. J. Eldridge, Consul-General at Beyrout, with a view of getting some authentic seed of the plant cultivated at Latakia. This, with the greatest kindness, he was good enough to obtain, although he was unable to send me the seed for some months, owing to the existence of quarantine. The packet, if sent, would have had to be pricked for the purpose of fumigation; and all the seed would have run out of the holes thus made.

He was further good enough to inform me that "this kind of tobacco owes its peculiar black colour and aromatic flavour to its being submitted, during seven or eight months, to fumigation of the wood of a shrub that grows wild in the Ansaryeh mountains, called, locally, Elez'r," and belonging to *Amentaceæ.*

I wrote to Mr. Eldridge to ask for some further information about this plant; and he was good enough to consult Dr. Post, the Professor of Botany at the Syrian Protestant College at Beyrout. He writes:—

"The plant alluded to under the name of 'el Ezr,' is probably the tree called 'el Arz.' Such transpositions of letters are very common in the colloquial Arabic. In classical use 'el Arz' refers to the famous Cedar of Lebanon, *Larix Cedrus*; but in the mouths of uneducated Syrians it designates one of the pines, *Pinus haleppensis*, which grows in great numbers on the mountains."

I therefore conclude that Latakia tobacco is produced by a different species from the Turkish, and that, as imported into this country, it consists of the flowering twigs made up into bundles which have been smoked with pine-wood.

On the Genus *Hoodia*, with a Diagnosis of a New Species.

By W. T. Thiselton Dyer, M.A., B.Sc., F.L.S.

[Read May 4, 1876.]

(Plate V.)

The genus *Hoodia* has long been very imperfectly understood. The original type was discovered by Colonel Gordon in Great Namaqualand. He preserved no specimen, but made a drawing which was afterwards published by Masson in his 'Stapeliæ Novæ,' under the name of *Stapelia Gordoni*; in his description he erroneously ascribed to it a 10-fid corolla. Sweet, without giving any characters or apparently having seen any further materials than Masson's figure, separated it under the name of *Hoodia* from *Stapelia* in the second edition of his 'Hortus Britannicus' (1830). Don (1837) also proposed to establish for it the genus *Monothylaceum*, based on the "singular form of the corolla and the solitary follicles;" the latter is not a real character, as the follicles are probably frequently geminate. Later still Sir W. Hooker established for this and a new species the genus *Scytanthus* (1844) in the 'Icones Plantarum.' And there can be little doubt that this name ought properly to stand, as it is the only one of the three which have been given to the genus which is accompanied by an accurate diagnosis. Decaisne, however, has set it aside in favour of *Hoodia*; and as this name has also been adopted by Mr. Bentham in the 'Genera Plantarum,' it has at any rate too much prescription in its favour to make it desirable to disturb it.

Sir W. Hooker's analysis was made from specimens, preserved in spirit, of a second species, *Hoodia Currori*. He correctly described the corona as duplex. Mr. Bentham, however, from an examination of the dried specimens in the Kew Herbarium, has been led to a different view of its structure, and regards the whole corona as uniseriate. He describes it as consisting of a cup-shaped body with 5 lobes incumbent upon the anthers, the wall of the cup between the points of origin of the lobes being expanded outwards into sinuses.

A very careful examination, however, of some more favourable materials than Mr. Bentham made use of has convinced me that the corona is really biseriate. I found in the Kew Museum a bottle labelled *Scytanthus Gordoni*, but which I have now no doubt really contained the original specimen of *Scytanthus Currori*. Unfortunately this had been preserved, at any rate for some time, in acetic acid; and the flowers fell to pieces immediately the bottle was disturbed. I was able, however, to carefully examine the corona, and also to dissect a young bud. The "sinuses" described by Mr. Bentham seemed to me without doubt to be a distinct whorl of organs. At the reëntering angle between each they are connected by a kind of septum with the back of the scales forming the internal series of coronal organs; and these in their turn are adnate to the base of the anthers. But these scales have a perfectly distinct attachment of their own (fig. 2 *b*), and cannot be regarded as merely inward prolongations of the angles of the external series. The examination of a young bud afforded a further confirmation of the existence of two whorls. The external coronal whorl forms a kind of frill (fig. 2, *c*) which overlaps the scales of the internal whorl quite distinctly above their point of attachment to it.

Sir W. Hooker did not venture upon any analysis of the dried flowers of *Hoodia Gordoni* collected by Burke. I have therefore given a drawing of the gynostemium (fig. 1) from a plant which flowered last year (1875) at Kew. The segments of the external corona are very shallowly bilobed; and the septa uniting them to the internal whorl are rather more distinct than in *Hoodia Currori*.

In a third and hitherto undescribed species the segments of the external coronal whorl are deeply 2-lobed (fig. 3). The scales of the internal whorl have a dorsal ridge continuous with the septum, but with a distinct notch at the point of junction, which is difficult to indicate in drawing the corona as seen from above.

The corona of *Hoodia* must therefore be regarded as "duplex." As in *Decabelone*, the inner whorl consists of five narrow scales incumbent on the anthers. In that genus, as in this, these scales are attached by septa to the external whorl. In *D. Barklyi* there are a series of five bifid processes alternating with them, which are wanting in *D. elegans*. The inner coronal whorl of the former appears to me to correspond to the "corona simplex" of *Boucerosia*, in which I regard the external coronal whorl as altogether wanting*. This may also be the case in *Frerea*.

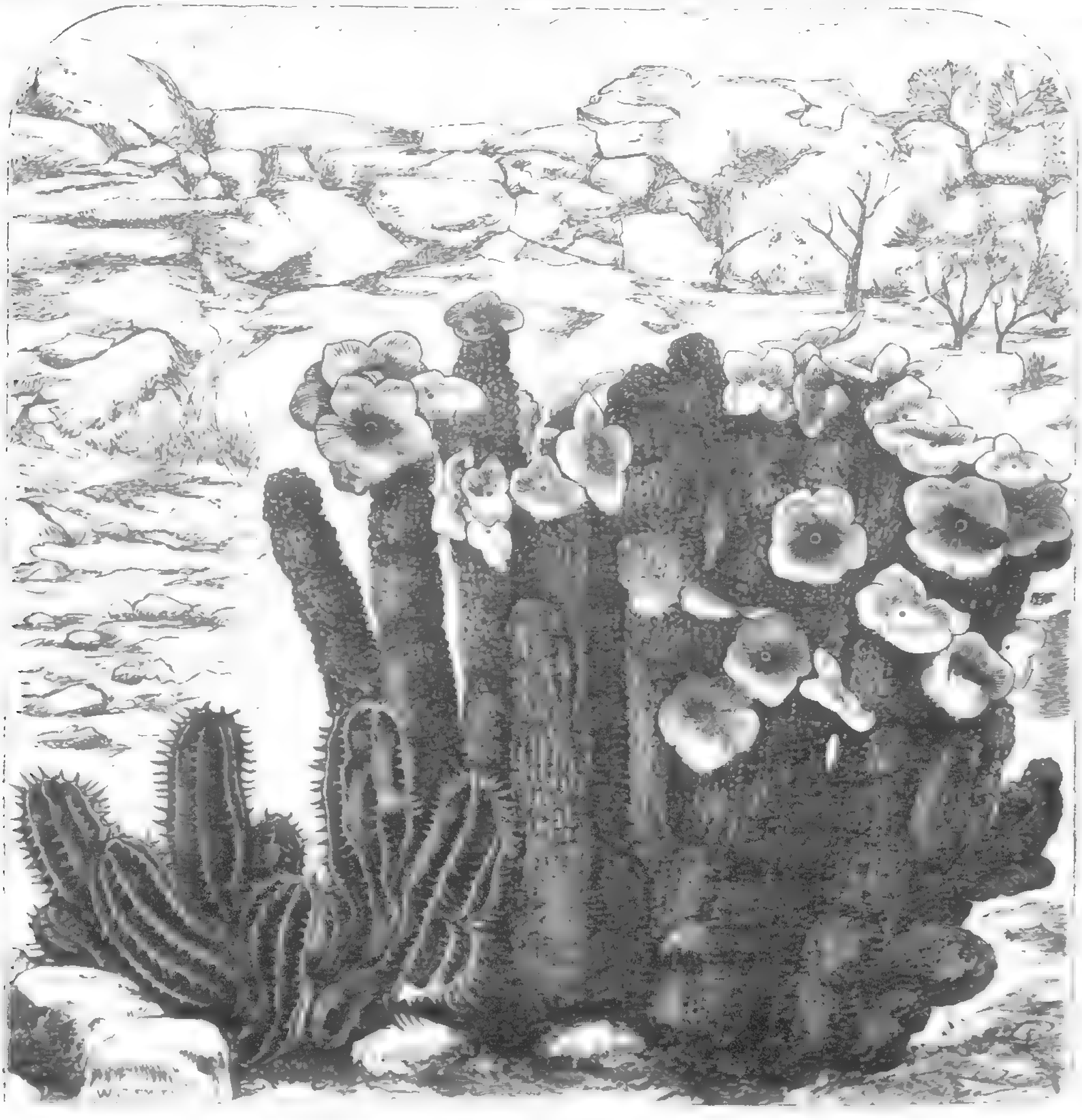
In *Caralluma*, which Robert Brown (followed by Decaisne and Bentham) described as having a "corona simplex," it may perhaps be doubted whether it is really so. Decaisne figures

---

* *Apteranthes*, which Mr. Bentham has united with *Boucerosia*, only differs from it in the same degree that *Decabelone elegans* and *Barklyi* differ from one another.

Caralluma subulata (Ann. des Sc. Nat. 2ᵉ sér. ix. tab. 9 D) as having a corona which is certainly double; and in describing his analyses (p. 346) he uses the expressions "*rangée externe*" and "*rangée interne*," which can hardly be properly applicable to a corona simplex. In point of fact if the external series of coronal organs in *Caralluma* were connate, we should have a structure essentially similar to that found in *Decabelone*. The individual segments are three-lobed, with the middle lobe very short. In *Decabelone elegans* the external coronal whorl is composed of five deeply bifid connate segments; and in *D. Barklyi* there is a minute third lobe at the bottom of the cleft.

By the kindness of Dr. Masters, F.R.S., I am enabled to reproduce from the 'Gardeners' Chronicle' a woodcut which appeared in the volume for 1873 (p. 576), and which represents a mass of *Hoodia Gordoni* in full flower. It was copied from a photograph



Hoodia Gordoni.

taken by the late Mr. Chapman when travelling in Damara Land. The tetramerous symmetry of some of the flowers is worth notice, and while, no doubt, accurate, is not indicated in any other materials illustrating the species which I have seen. The fine plate in the 'Botanical Magazine' appears to err with regard to the colour of the flowers, which did not strike me as at all tinged with yellow, but rather as of a very pale brown inclining towards a faint salmon-colour.

HOODIA, *Sweet.*

HOODIA, *Sweet, Hort. Brit.* 2nd ed. 359; *Dcne. in DC. Prodr.* viii. 664; *Benth. & Hook. f. Gen. Pl.* ii. 783.
Monothylaceum, *Don, Gen. Syst.* iv. 116.
Scytanthus, *Hook. Icon.* sub tt. 605, 606.

CHAR. EMEND.—*Calyx* brevis, 5-partitus, foliolis acuminatis basi glandulis minutis interpositis. *Corolla* tubo parvo, limbo maximo dilatato concavo demum explanato membranaceo nervoso obsolete 5-lobo, lobis abrupte apiculatis. *Corona* duplex, cyathiformis vel rotata; exterior tubo stamineo septis affixa, 5-partita, segmentis latis cavis bifidis vel plus minusve 2-lobis; interior squamis 5, septis antherisque basi adnatis, oblongis, incumbentibus. *Antheræ* breves, oblongæ, inappendiculatæ, stigmati incumbentes et semiimmersæ. *Pollinia* erecta, semiorbicularia, funiculo appendice membranacea lanceolata munito. *Stigma* vertice subplanum. *Folliculi* utrinque acuminati, læves.—Herbæ *cactiformes* Africæ australis et tropicæ *incolæ*.

The three known species are all endemic to the west coast of Africa. They range from 15° to about 32° S. lat., and progressively diminish in size as they advance southwards. While closely agreeing with one another in all essential characters, they differ conspicuously in their habit and large pale membranous flowers from any other of the *Stapelieæ*. The closest affinity of *Hoodia* is probably with *Decabelone*, which is geographically associated with it.

1. HOODIA CURRORI, *Dcne. in DC. Prodr.* viii. 665.

Corolla diametro 5–6-pollicari demum explanata margine ciliato intus pilosa, coronæ exterioris segmentis apice bifidis.—Scytanthus Currori, *Hook. Icon.* tt. 605, 606.—S. Burkei, *Hook. Icon.* sub t. 625.

Hab. Angola, Elephant's Bay, lat. 14° S., *Curror, Monteiro.*

2. **Hoodia Gordoni**, *Sweet, Hort. Brit.* 2nd ed. 359.

Corolla diametro 4-pollicari demum explanata intus glabra, coronæ exterioris segmentis oblongis obscure bifidis.—*Dcne. in DC. Prodr.* viii. 665; *Dyer in Bot. Mag.* t. 6228.—Stapelia Gordoni, *Mass. Stap. Nov.* 24, t. 40; *Don, Gen. Syst.* iv. 116.—Monothylaceum Gordoni, *Don, l. c.*—Scytanthus Gordoni, *Hook. Icon.* t. 625.

Hab. Orange River, lat. 29° S., *Gordon, Burke, Barkly.*

3. **Hoodia Barklyi**, sp. nov. Corolla diametro 2-pollicari cyathiformi margine recurvo intus glabra, coronæ exterioris segmentis profunde bifidis.

Hab. Karoo, ? lat. 32°–33° S., *McGibbon.* Omnibus in partibus dimidio minor quam *H. Gordoni*; caules ramosiores, aculeis brunneis tenuioribus semipollicaribus.

The Kew Herbarium is indebted to H.E. Sir Henry Barkly, the Governor of the Cape, for an admirable drawing, with a manuscript description and dried flowers, of this very distinct species. It was received by Mr. McGibbon from the Karoo; "but where or when seems uncertain; it did not, however, come from Namaqualand." It flowered in the Cape-town Botanic Gardens in 1874. Although complimentary names are perhaps best avoided, I have felt that the example of Masson and Sir W. Hooker could hardly but be followed in this case, and have therefore dedicated the species to Sir H. Barkly, to whom we are indebted for the means of describing it.

EXPLANATION OF PLATE V.

Fig. 1. *Hoodia Gordoni*: gynostemium, viewed from above. Magnified.

2. *Hoodia Currori*: *a*, gynostemium, viewed from above; *b*, two segments of inner coronal whorl, seen from without (i. attachment of septum connecting the internal and external whorls of the corona; ii. stigmatic gland; iii. empty anthers); *c*, gynostemium from young bud (the two coronal whorls are only partially developed). All magnified.

3. *Hoodia Barklyi*: gynostemium, viewed from above. Magnified.

4. *Decabelone Barklyi*: gynostemium, viewed from above; the external coronal whorl is only seen in section. Magnified.

Revision of the Genera and Species of Anthericeæ and Eriospermeæ. By J. G. Baker, Esq., F.L.S.

[Read December 2, 1875.]

The present is the fifth of the series of monographs on sections of the natural order Liliaceæ which I have had the honour of laying before the Society. It includes the small tribe Eriospermeæ and the large tribe Anthericeæ. These two, with Scilleæ and Tulipeæ, which have been treated already, and Allieæ, Aphyllantheæ, and Yuccoideæ, still untouched, make up that large central series in the order, which is characterized by distinct perianth-segments in combination with capsular fruit and introrse stamens. Eriospermeæ are well marked from all the other Liliaceæ by their peculiar habit, large arms, and testa clothed with a dense mass of silky hairs. We know now twenty species against Kunth's eight in 1843; and as the genus or, what is the same thing, the tribe stretches from Cape colony to Abyssinia and Angola, it is probable that many new species still remain to be discovered. Anthericeæ is the largest of all the tribes of Liliaceæ, and the one that of all others has most needed revision. Scarcely any of its members are showy enough to be objects of general cultivation, like many of the genera which I have already treated; and this is no doubt one reason why it has been so neglected. Its geographical range is very wide, and stretches over extensive tracts of the country that have only been explored of late years, such as Central Africa, Central Asia, and the Transvaal region; and as the species known of old are classified and characterized in such a confused way that it is impossible to recognize many of them, the consequence has been that very few of the novelties of recent gathering have been named and described, and there is no tribe in the order in which there are so many novelties left for a monographer to publish. Besides publishing novelties, and redescribing, after inspection of the types, species of which the existing descriptions are too meagre for their recognition, the principal revision that is needed is in regard of the plants which I have placed under *Anthericum*. *Anthericum* is a genus that was published by Linnæus, which was maintained by Willdenow and by Roemer and Schultes. When Kunth, in 1843, worked up the tribe for the fourth volume of his 'Enumeratio,' he sunk the name *Anthericum* altogether, dividing the plants that had been placed under it by his predecessors under five genera—*Phalangium, Bulbinella, Trachyandra, Cæsia*, and *Chlorophytum*. But to do this with *Cæsia* and *Chlorophytum* spoils the best distinctive marks of the two genera, subindehiscent capsules in the one case and discoid seeds in the other. *Phalangium* is a name of Tournefort's, used in post-Linnean times by Poiret; *Bulbinella* and *Trachyandra* are genera constituted by Kunth to receive all the old *Antherica* which he does not place under *Phalangium* or remove to *Cæsia* and *Chlorophytum*. But the lines of demarcation between the five, at the best are very faint; and as Kunth has located a large number of species of which he had no specimens to examine, he has often placed them in the wrong genus, or described the same plant (insufficiently for recognition) two or three times over under different genera. Here I have gone back to *Anthericum* in the Linnean sense, paring away only such plants as *Lloydia serotina* and *Narthecium*, which have been separated by general consent; and in this acceptation, even after separating *Chlorophytum*, it contains 82 species, and is the third largest genus in the order, *Allium* and *Asparagus* being the only two that outnumber it. In identifying the species the essential clue to the insufficiently described types of old date rested in the herbarium of Thunberg, by whom most of them were originally described; and here, once again, I have to place on record my obligation to Dr. Theodor Fries and the authorities of the University of Upsala, who have sent me the set to England for leisurely study and comparison. Beyond this, the material used has, as in former cases, been derived from the three great London herbaria, that of M. Alphonse De Candolle, of Lindley at Cambridge, and the fine set of Cape specimens brought together by Dr. Harvey at Dublin, for the loan of which I have again cordially to thank Professor Perceval Wright.

The following is a summary sketch of the range of character in the different organs which these two tribes show.

Roots and Rootstocks.—The common type of root is a bundle of more or less thickened adventitious fleshy fibres, either cylindrical and tapering gradually to the end, or thickened in the lower part into small tubers. The rootstock in *Eriospermum* is always thickened into a large irregularly shaped fleshy corm, and often becomes a decided corm in isolated species of various Anthericoid genera, such as *Anthericum croceum, Bulbine pugioniformis*, an

Thysanotus sparteus. True bulbs do not occur in either of the two tribes.

Leaves.—The leaves, in the great mass of the species, are narrow linear, produced at the same time as the flowers, and firm enough in texture to be as persistent as those of an average grass, with close distinct vertical ribs, which do not leave any space between them for transverse venules. In *Bulbine* they are fleshy and yield copious yellow juice, sometimes subterete with a channel down the face, and in other species *Narcissus*-like or lanceolate. In *Hodgsoniola* they are rush-like, in *Xeronema* ensiform and *Iris*-like. In *Narthecium* they are linear and concentrated in a distichous basal rosette. In *Metanarthecium* they are oblanceolate, with distinct transverse venules between the vertical ribs. In one group of *Thysanotus* they have all disappeared by the time the flowering-stems are produced. In one group of *Chlorophytum* they have a membranous oblong or lanceolate lamina narrowed into a distinct clasping petiole. In *Eriospermum* they are usually solitary with a broad distinctly petiolate blade, and are produced at a different season than the flowers.

Stems and general Habit.—Here we have great variety. The common type in Anthericeæ is that of an erect perennial herb, with a rosette of leaves from the crown of the root, and the stem furnished below the inflorescence with few similar leaves reduced in size. The acaulescent scape-bearing type, ending in a simple raceme, so common in the bulbiferous Liliaceæ, is reproduced here in *Eriospermum* and *Bulbine.* Densely leafy produced stems occur in *Stypandra* and *Asphodeline.* The most striking departures from ordinary type in habit are presented by:—certain Australian Anthericeæ; *Thysanotus Patersoni*, which is one of the few decidedly scandent Liliaceæ; the three species of the *Corynotheca* section of *Cæsia*, which are rigid undershrubs of almost furze-like habit, with ditrichotomous or pinnate ramification, and two species of *Tricoryne*, with flattened herbaceous stems.

Inflorescence.—In both the *Antherica* and the Asphodels the flowers are commonly racemose, with a strong tendency in the racemes to become compound and to form panicles with racemose branches. In *Eriospermum*, *Bulbine*, *Narthecium*, *Eremurus*, *Xeronema* and some other genera the racemes are essentially simple, as in *Scilla* or *Hyacinthus*. The inflorescence becomes a simple corymb in *Chamæscilla* and *Morgagnia.* This corymb springs direct from the root in *Anthericum*, section *Holopodium*, and is reduced down to a single flower, sessile in the centre of the basal rosette of leaves, in *Herpolirion*. *Stypandra*, *Pasithea* and *Eccremis* furnish good instances of a panicle with corymbose branches. In *Thysanotus* and *Tricoryne* the basis of the inflorescence is an umbel, which is sometimes reduced down to a single flower, the umbels being usually panicled, but occasionally single. Persistent membranous bracts are nearly always present at the base of the pedicels, and often furnish good specific characters. The pedicel is nearly always articulated at the middle or tip.

Perianth.—The flowers are usually whitish, with a purplish-brown keel, but they are occasionally blue, yellow, purple or rose-red. The expanded perianth is funnel-shaped in the Asphodels, rotate in the typical Anthericeæ; on the whole the structure of the perianth in all the 27 genera is extremely uniform. *Asphodelus* and *Asphodeline* have a distinct basal urceolus, thus presenting a transition towards the gamophyllous genera. The shape of the perianth is never decidedly irregular, the nearest approach to it being in *Asphodeline*, where the stamens are distinctly declinate. Here as in the other tribes of *Liliaceæ*, the three inner segments are often broader and blunter than the three outer. In *Thysanotus*, *Siona* and *Bottinæa* the three inner segments are densely fimbriated and much more delicate in texture than the three outer, which, in the bud, are placed almost edge to edge. In *Selonia*, which I have not seen, the three outer segments are also said to differ greatly in texture from the three inner. The segments are always six in number, with a decidedly imbricate æstivation. The number and arrangement of the prominent dorsal nerves of the perianth-segments often furnish distinctive characters for genera and subgenera. A regular spiral twisting of the perianth after the flowers fade marks nearly all the sections of *Cæsia* and the section *Streptanthera* of *Anthericum*.

Stamens.—On the whole the most important characters for genera are furnished by the stamens. Except in *Anemarrhena*, they are always inserted at or very near the base of the perianth; but both filament and anther vary greatly. Usually the filaments are subulate and the whole stamen shorter than the perianth-lobes. In *Eremurus* proper the stamens are remarkably conduplicate in bud, and twice as long as the funnel-shaped perianth when fully expanded. In *Asphodelus* and *Asphodeline* the lanceolate filaments meet edge to edge, and permanently enclose the ovary. In six of the genera of Anthericeæ the filaments are variously bearded, and in *Bulbine semibarbata* three of them are bearded and three naked. Three of the stamens are entirely aborted in *Anemarrhena* and *Thysanella*. In *Echeandia* and *Hodgsoniola*, the anthers are syngenesious; and in the latter genus three of them are reduced to mere rudiments. In *Asphodeline* and *Thysanotus* proper the three outer stamens are materially different from the three inner in shape and size. Usually the anther is versatile with longitudinal dehiscence; but it is basifixed in *Dichopogon*, *Eccremis*, and *Thysanotus*, and dehisces by terminal pores in *Thysanotus*. In *Dichopogon* and *Arthropodium* the cells are produced into curious tails.

Pistil.—In these tribes, as in fact in the whole order Liliaceæ, there is comparatively little variation in the gynæcium. The carpels of the ovary are always three and the placentation axile. Sometimes the ovules are two, ascending and collateral, sometimes more numerous and superposed; but in *Anthericum* and *Cæsia*, as in *Scilla*, both these types occur in a series of species which in habit and other points of structure entirely coincide. The fruit is always capsular; and in the great majority of the genera its dehiscence is loculicidal. In *Cæsia* and *Tricoryne* it dehisces very late or not at all; and in the latter we have peculiar one-seeded turbinate cocci, of which often only one out of the three is developed. The style is always simple, and often, although the perianth is regular, shows a decided tendency to become declinate; and the stigma is capitate. The seeds are usually few in number and turgid; but in *Chlorophytum*, *Metanarthecium* and one section of *Cæsia* they are discoid, as in *Urginea*, *Drimia* and the Lilies and Tulips. *Narthecium* differs from all the other Anthericeæ by its very numerous minute seeds tailed at both ends, like those of a rush. The testa is usually thin and either brown or black, sometimes opaque and sometimes lucent. In *Eriospermum* it is coated with a dense mass of persistent hairs; and in *Thysanotus* there is a small cupular basal arillus.

Geography.—The number of species in the two tribes is 261; of these upwards of 80 belong to *Anthericum* as here defined. The next largest genus is *Chlorophytum*, with 35 species. Then follow *Bulbine*, 22, *Eriospermum*, 20, *Eremurus*, 18, *Thysanotus*, 16, *Asphodeline*, 14, *Cæsia*, 13. Anthericeæ contains 13 monotypic genera. The tribe is the most cosmopolitan of all the tribes of Liliaceæ; and *Anthericum*, though none of the species has a very wide area, is the most wide-spread genus of the order. America has 12 species of *Anthericum*, 2 of *Chlorophytum*, 2 of *Narthecium*, and four monotypic genera (*Echeandia*, *Bottinæa*, *Pasithea*, and *Eccremis*), in all twenty species, against 241 for the Old World. In *Narthecium*, we have four very closely allied forms, here treated as species, representing one another in four different geographical areas of the north temperate zone, Europe, Japan, California and the Atlantic States. Five of the genera (*Anthericum*, *Asphodelus*, *Paradisea*, *Asphodeline*, and *Morgagnia*) are represented in the European flora; *Asphodeline* belongs to the Mediterranean and Oriental region, and *Eremurus* (with eighteen species) belongs to Central Asia. There are three monotypic genera in North Asia and Japan, *Selonia*, *Anemarrhena* and *Metanarthecium*. Eight genera, containing about fifty species, are nearly or quite endemic in Australia; *Bulbine* belongs to both the Cape and Australia; and there is one species in tropical Africa of the otherwise Australian genus *Cæsia*. *Chlorophytum*, with 35 species, belongs almost entirely to tropical Africa and tropical Asia; *Eriospermum* belongs entirely to the Cape and Tropical Africa; and it is at the Cape we have the greatest concentration of the two large genera *Anthericum* and *Bulbine*, but not a single endemic genus.

CLAVIS TRIBUUM ET GENERUM.

Tribus I. CHLOROGALEÆ (continued from Linn. Journ. xiii. p. 215). Herbæ bulbosæ, pedunculis parce foliatis vel nudis, floribus paniculatis.

1. SCHIZOBASIS. Pedunculus rectus nudus. Capsula loculicide trivalvis. Ovula in loculo gemina collateralia. *Capensis.*

Tribus II. ERIOSPERMEÆ. Herbæ acaules, floribus simpliciter racemosis, cormo magno tuberoso præditæ, seminibus dense lanuginosis.

2. ERIOSPERMUM. Genus solum. *Cap. B. Spei et Africa tropicalis.*

Tribus III. ANTHERICEÆ. Herbæ acaules vel caulescentes haud bulbigeræ, floribus racemosis vel racemoso-paniculatis raro umbellato-paniculatis, pedicellis sæpissime articulatis, seminibus calvis.

Subtribus I. ASPHODELEÆ. Perianthium expansum infundibulare raro campanulatum.

3. ANEMARRHENA. Stamina 3, filamentis brevissimis alte perigynis. *China et Japonia.*

Asphodelus. Perianthium album, segmentis dorso uninervatis. Stamina 6, filamentis subæquilongis inclusis leviter declinatis basi dilatatis. *Zonæ bor. temp. et trop. veteris orbis.*

5. **Asphodeline.** Perianthium luteum vel album, segmentis dorso uninervatis. Stamina 6, filamentis inæquilongis valde declinatis basi dilatatis. *Oriens et regio mediterranea.*

6. **Eremurus.** Perianthium album roseum vel luteum, segmentis dorso distincte anguste vittatis. Stamina 6, filamentis filiformibus sæpe exsertis. *Asia temperata.*

7. **Selonia.** Perianthii segmenta exteriora viridula sepaloidea, interiora petaloidea alba. Stamina 6, filamentis filiformibus exsertis. *Turkestania.*

8. **Metanarthecium.** Perianthium luteum, segmentis late viridi vittatis. Semina plura minuta. Stamina 6 inclusa, filamentis filiformibus. Folia reticulato-nervulosa. *Japonia.*

9. **Paradisea.** Perianthium album, segmentis conformibus oblongo-spathulatis dorso laxe trinervatis. Flores racemosi. Stamina 6, filamentis filiformibus inclusis. *Europa meridionalis.*

10. **Herpolirion.** Perianthium cæruleum, segmentis dorso laxe 3–5-nervatis. Folia disticha, floribus in centro rosulæ solitariis sesilibus. *Tasmania et Nova Zealandia.*

11. **Xeronema.** Perianthium rubrum corollinum, segmentis angustis 1-nervatis. Folia magna disticha ensiformia. Stamina 6, filamentis filiformibus exsertis. *Nova Caledonia.*

Subtribus II. **Euanthericeæ.** Perianthium expansum rotatum.

* *Capsula cite loculicide trivalvis.*

a. Stamina syngenesia.

12. **Echeandia.** Stamina 6 æqualia. Folia plura graminoidea. *Andes.*

13. **Hodgsoniola.** Stamina 3, antheris minutis abortivis. Folium unicum juncoideum. *Australia occidentalis.*

b. Stamina libera filamentis nudis.

14. **Anthericum.** Flores racemoso-paniculati sæpissime albi, segmentis subconformibus. Semina turgida. Antheræ ecaudatæ. *Cosmopol.*

15. **Dichopogon.** Flores racemoso-paniculati purpurei, segmentis subconformibus. Semina turgida. Antheræ caudatæ. *Australia.*

16. Eccremis. Flores corymboso-paniculati cærulei, segmentis exterioribus firmioribus. Semina turgida. Antheræ basifixæ ecaudatæ. *Andes.*

17. Pasithea. Flores corymboso-paniculati cærulei, segmentis subconformibus. Semina turgida. Antheræ versatiles ecaudatæ. *Chili.*

18. Chlorophytum. Flores racemoso-paniculati albidi, segmentis subconformibus. Antheræ ecaudatæ. Capsula acuta angulata, seminibus discoideis. *Cosmopol.*

19. Bottinæa. Flores racemoso-paniculati albi, segmentis interioribus dense barbatis. *Chili.*

20. Thysanotus. Flores umbellato-paniculati vel umbellati purpurei, segmentis exterioribus sepaloideis, interioribus petaloideis fimbriatis. Antheræ 6 inæquales vel 3 abortivæ. *Australia, Ins. Philip., China.*

c. Stamina libera filamentis stupposis.

21. Bulbine. Flores simpliciter racemosi sæpissime densi lutei. Folia sæpissime carnosa. Semina pauca turgida. *Cap. B. Spei et Australia.*

22. Narthecium. Flores simpliciter racemosi luteo-virides. Semina minuta utrinque caudata. Folia dura disticha. *Zona temp. borealis.*

23. Siona. Flores racemoso-paniculati, segmentis interioribus fimbriatis. *Australia.*

24. Arthropodium. Flores racemoso-paniculati albi vel purpurei, segmentis subconformibus. *Australia, Nova Zealandia, Nova Caledonia.*

25. Morgagnia. Flores corymboso-paniculati, segmentis conformibus. Folia graminoidea. *Europa occidentalis et Algeria.*

26. Stypandra. Flores corymboso-paniculati cærulei, segmentis exterioribus firmioribus. Antheræ basifixæ. Folia dura. *Australia.*

** *Capsula profunde lobata indehiscens vel tarde trivalvis.*

27. Cæsia. Flores racemosi vel corymbosi. Filamenta nuda. *Australia, Africa tropicalis.*

28. Tricoryne. Flores umbellato-paniculati, raro simpliciter umbellati. Filamenta stupposa. *Australia.*

1. Schizobasis, *Baker.*

Baker in Trimen's Journ. 1873, p. 105.

Perianthium albidum corollinum 6-partitum, segmentis ligulatis subæqualibus dorso uninervatis marcescentibus post anthesin supra basin circumscissis, capsulam immaturam calyptratim coronantibus. *Stamina* 6 inclusa, filamentis hypogynis applanatis rectis, antheris oblongis versatilibus. *Ovarium* globosum sessile, ovulis in loculo geminis collateralibus erectis; stylus filiformis subrectus, ovario æquilongus; stigma punctiforme. *Capsula* sessilis depresso-globosa loculicide trivalvis, seminibus triquetris, testa nigra membranacea, albumine carnoso. *Herbæ parvæ capenses, bulbis magnis globosis membranaceo-tunicatis præditæ, foliis hysteranthiis subulatis, floribus parvis albidis anthericoideis laxe racemosis vel paniculatis, bracteis perminutis deltoideis, pedicellis apice articulatis.*

Racemus simplex, pedicellis inferioribus longissimis.
1. *S. flagelliformis.*

Racemi copiose paniculati.
  Rachis racemorum subrecta .... 2. *S. Macowani.*
  Rachis racemorum insigniter angulatim flexuosa.
3. *S. intricata.*

1. S. FLAGELLIFORMIS, *Baker.*—Anthericum flagelliforme, *Baker, Trimen's Journ.* 1872, 140. Bulbum et folia non vidi. Scapus infra inflorescentiam 4–9-pollicaris glaber flexuosus. Racemus simplex flagelliformis 3–12-pollicaris, rachi gracili dura parum flexuosa, pedicellis ascendentibus, inferioribus interdum 5–6 poll. longis, superioribus sensim brevioribus, supremis 1½–3 lin. longis. Bracteæ perminutæ deltoideæ. Perianthium albidum 2–2½ lin. longum, segmentis lanceolatis dorso brunneo-vittatis. Stamina perianthio triente breviora. Stylus 1 lin. longus. *Cap. B. Spei, ad ripas fluminis Aapages,* Burke!

2. S. MACOWANI, *Baker, in Trimen's Journ. loc. cit.* Bulbus globosus membranaceo-tunicatus 1–1½ poll. crassus. Folia hysteranthia ignota. Scapus gracilis durus flexuosus, infra inflorescentiam 3–4 poll. longus, basi pilis setosis patulis hispidus. Rami paniculæ ascendentes, simplices vel inferiores trifurcati. Racemi ad paniculam 3–12, laxe 12–20-flori, 1–2 poll. longi, 5–6 lin. lati, rachi vix flexuosa. Bracteæ minutissimæ deltoideæ. Pedicelli inferiores ascendentes vel patuli, apice articulati, 3–4 lin. longi. Perianthium campanulatum 1–1½ lin. longum, segmentis ligulatis dorso late brunneo-carinatis. Capsula depresso-globosa glabra 1 lin. longa, valvis rotundis dorso turgidis lævibus. *Cap. B. Spei, in lapidosis prope Somerset East,* MacOwan 1847!

3. S. INTRICATA, *Baker in Trimen's Journ.* 1874, 368.—Anthericum intricatum, *Baker, Trimen's Journ.* 1872, 140.—Asparagus micranthus, *Thunb. herb. non Lindl.* Bulbus primum foliiferus parvus ovoideus,

demum major globosus floriferus 12–15 lin. crassus, tunicis albidis membranaceis. Folia 4–10 subulata erecta carnosa glabra 2–3 poll. longa $\frac{1}{2}$ lin. crassa. Scapus firmus gracillimus durus flexuosus 2–6-pollicaris. Panicula obverse deltoidea 2–6 poll. longa et lata, ramis multis ascendentibus, inferioribus iterum furcatis. Racemi ultimi laxissimi $1\frac{1}{2}$–2 poll. longi, rachi insigniter angulatim flexuosa, pedicellis ascendentibus filiformibus 9–12 lin. longis. Bracteæ minutissimæ deltoideæ. Perianthium 1–$1\frac{1}{2}$ lin. longum, diu campanulatum, segmentis dorso distincte purpureo-brunneo carinatis. Stamina inclusa antheris oblongis. Capsulam non vidi. *Cap. B. Spei*, Thunberg! Burke 370! Zeyher 4284! MacOwan 2131!

2. ERIOSPERMUM, *Jacq.*

Jacq. Coll. Suppl. 81, fig. 1; *Endlich. Gen.* No. 1196; *Kunth, Enum.* iv. 649.—Phylloglottis et Thaumaza, *Salisb. Gen.* 15. —Ornithogali et Antherici sp., *Linn.*

Perianthium corollinum 6-partitum campanulatum, segmentis oblongis subæqualibus dorso 1-nervatis viridi vel purpureo vittatis. *Stamina* 6 inclusa perigyna, filamentis subuniseriatis plus minus applanatis, antheris oblongis versatilibus introrsis. *Ovarium* sessile biloculare, ovulis in loculo sæpissime pluribus, raro geminis; stylus filiformis; stigma capitatum. *Capsula* obovoidea coriacea obtuse trigona loculicide trivalvis, valvis persistentibus, seminibus 2 vel paucis turgidis pilis copiosis mollibus vestitis, testa pallida membranacea, albumine carnoso. *Herbæ acaules, floribus racemosis, pedicellis inarticulatis basi minute bracteatis, foliis coriaceis sæpissime solitariis post scapum productis, tubere magno difformi præditis.*

Folia solitaria hysteranthia pilosa. 1. *E. lanuginosum.* 2. *E. pubescens.* 3. *E. brevipes.*

Folia solitaria hysteranthia glabra oblongo- vel lineari-lanceolata. 4. *E. abyssinicum.* 5. *E. calcaratum.* 6. *E. parvifolium.* 7. *E. lanceæfolium.*

Folia solitaria hysteranthia glabra cordato-rotundata. 8. *E. Bellendeni.* 9. *E. latifolium.* 10. *E. Cooperi.* 11. *E. albucoides.*

Folia hysteranthia ignota. 12. *E. spirale.* 13. *E. ornithogaloides.*

Folia solitaria synanthia cordato-rotundata … 14. *E. corymbosum.*

Folia 2–3 synanthia lata nuda. 15. *E. Mackenii.* 16. *E. Kirkii.*

Folia solitaria facie prolifera. 17. *E. paradoxum.*
18. *E. Bowieanum.* 19. *E. proliferum.*
20. *E. folioliferum.*

1. E. LANUGINOSUM, *Jacq. Hort. Schoen.* iii. 7, t. 265; *Kunth, Enum.* iv. 653. Tuber magnum difforme extus cinereum intus purpureum. Folium post scapum productum solitarium cordato-ovatum coriaceum 4 poll. longum utrinque lanuginosum, petiolo tereti biunciali. Scapus subpedalis inferne pilosus. Racemus subpedalis laxissime 30–40-florus 3-4 poll. latus, pedicellis ascendentibus 1½–2 poll. longis. Bracteæ minutæ lanceolatæ. Perianthium 4 lin. longum, segmentis flavidis acutis purpureo vittatis, interioribus erectis. Stamina segmentis paulo breviora filamentis lanceolatis. Semina fusca lana alba. *Cap. B. Spei.*

2. E. PUBESCENS, *Jacq. Hort. Schoen.* iii. 8, t. 264; *Lindl. Bot. Reg.* t. 578; *Kunth, Enum.* iv. 653. Tuber subrotundum fuscum intus rubrum. Folium post scapum productum solitarium rotundato-cordatum cuspidatum 2–3 poll. longum et latum utrinque pilosum, petiolo 1–3-pollicari præditum. Scapus gracillimus 6–9-pollicaris. Racemus laxe 10–20-florus, expansus 2–4 poll. longus, 9–12 lin. latus, pedicellis ascendentibus 3–12 lin. longis. Bracteæ minutæ deltoideæ. Perianthium 2 lin. longum, segmentis albis viridi-vittatis, exterioribus oblongis, interioribus obovatis. Stamina perianthio duplo breviora, filamentis latis albis. Stylus ½ lin. longus ovario æquilongus. Ovula in loculo 6–8. *Cap. B. Spei,* Zeyher 4279! Cooper! McOwan 1822!

3. E. BREVIPES, *Baker.* Scapus 6–12-pollicaris. Folium solitarium, post scapum productum, perfectum non vidi, ovatum acutum pilosum, petiolo piloso 1½–2 poll. longo basin scapi amplectente præditum. Racemus subdensus 30–50-florus, pedicellis ascendentibus 1–3 lin. longis. Bracteæ minutæ deltoideæ. Perianthium campanulatum 2 lin. longum, segmentis albis obtusis brunneo vittatis. Stamina segmentis triente breviora, antheris albis subglobosis. Stylus ½ lin. longus. Capsula obovoidea 3 lin. longa, seminibus in loculo 2–4. *Cap. B. Spei,* Burchell 4779! *Kaffraria,* Mrs. Hutton! *Somerset,* Bowker!

4. E. ABYSSINICUM, *Baker.*—Bulbine unifolia, *Schwein. Fl. Callab. Exsic.* No. 26. Cormus oblongus, fibris multis setosis coronatus. Folium solitarium post scapum productum lineare coriaceum glabrum 5–6 poll. longum distincte multinervatum e medio 3–6 lin. lato utrinque angustatum, petiolo 1½–2-pollicari præditum. Racemus laxissime 20–30-florus expansus semipedalis, pedicellis ascendentibus ½–2½ poll. longis. Bracteæ minutæ persistentes lanceolato-deltoideæ. Perianthium 2½–3 lin. longum, segmentis oblongis obtusis albidis

anguste viridi carinatis. Stamina perianthio triente breviora, filamentis lanceolatis, antheris filamento 3–4plo brevioribus. Stylus ovario æquilongus. Ovula in loculo 2 erecta. *Callabat, ad ripam fluminis Gendua,* Schweinfurth 26!

5. E. CALCARATUM, *Baker.* Cormus magnus oblongus. Folium post scapum productum sessile lanceolatum acutum glabrum 2 poll. longum, 5 lin. latum, basi haud cordatum, lineis duobus longitudinalibus depressis percursum. Scapus teres gracillimus semipedalis glaucus. Racemus laxe 20–30-florus, expansus 3–4 poll. longus, pedicellis ascendentibus apice cernuis 2–3 lin. longis. Bracteæ minutæ deltoideæ calcari falcato 1½–2 lin. longo præditæ. Perianthium 2½ lin. longum, segmentis oblanceolatis obtusis albis late viridi carinatis, interioribus paulo minoribus. Stamina perianthio paulo breviora, filamentis conformibus subulatis antheras oblongas duplo superantibus. Stylus ovario oblongo æquilongus. Ovula in loculo plura. *Cap. B. Spei, in ditione Graaf-Reinet,* Bolus! (v. v. in Hort. Kew. 1874).

6. E. PARVIFOLIUM, *Jacq. Coll. Suppl.* 74, *Ic.* t. 422; *Schult. fil. Syst.* vii. 504; *Kunth, Enum.* iv. 650.—Hyacinthus convallarioides, *Drège, Exsic. non Linn.*—E. Dregeanum, *Presl, Bot. Bemerk.* 113. Tuber subglobosum extus fuscum intus album. Folium post scapum productum coriaceum utrinque glabrum oblongum vel oblongo-lanceolatum 1–1½ poll longum obtusum minute cuspidatum obscure ciliolatum basi deltoideum vel rotundatum, petiolo gracili laminæ æquilongo præditum. Scapus gracillimus ½–1-pedalis. Racemus laxe 6–30-florus, expansus 2–4 poll. longus, 9–12 lin. latus, pedicellis 3–12 lin. longis. Bracteæ minutissimæ deltoideæ. Perianthium 2–2½ lin. longum, segmentis ligulatis obtusis albidis primum viridi demum brunneo carinatis. Stamina perianthio paulo breviora, filamentis subulatis antheras subglobosas 4–5plo superantibus. Ovula in loculo 5–6. Capsula obovoidea perianthio vix longior. Stylus 1 lin. longus. *Cap. B. Spei,* Burchell 4943! 6676! 7624! 8343! Drège! Cooper 3297!

7. E. LANCEÆFOLIUM, *Jacq. Coll. Suppl.* 72, *Ic.* t. 421; *Red. Lil.* t. 394; *Schult. fil. Syst.* vii. 503; *Kunth, Enum.* iv. 651. Tuber magnum subrotundum fuscescens. Folium solitarium post scapum productum oblongo-lanceolatum coriaceum glabrum 3–6 poll. longum, medio 1–2 poll. latum obtusum, in petiolum pollicare canaliculatum angustatum. Scapus teres pedalis. Racemus subdensus, expansus 3–6 poll. longus, 1–1½ poll. latus, pedicellis ascendentibus 3–12 lin. longis. Bracteæ amplexicaules scariosæ deltoideæ persistentes ½–1 lin. longæ. Perianthium 3–4 lin. longum, segmentis obtusis ochroleucis purpureo tinctis primum viridi demum brunneo carinatis, exterioribus oblongis, interioribus obovatis. Stamina perianthio triente breviora, filamentis

linearibus, antheris oblongis filamento 4–5plo brevioribus. Stylus $1\frac{1}{2}$ lin. longus, stigmate capitato. Ovula in loculo circiter 6. *Cap. B. Spei, in ditione orientali,* Mrs. Barber! MacOwan!

8. E. Bellendeni, *Sweet, Hort. Brit.* edit. 2, 529 (*nomen solum*).—E. latifolium, *Gawl. Bot. Mag.* t. 1382, *non Jacq.* Tuber magnum fuscum difforme. Folium solitarium post scapum productum rotundato-cordatum cuspidatum 2–3 poll. longum et latum, petiolo canaliculato 2–3-pollicari, coriaceum glauco-viride utrinque glabrum. Scapus $\frac{1}{2}$–1-pedalis teres. Racemus floriferus subdensus 3–6 poll. longus, expansus 9–12 lin. latus, pedicellis ascendentibus 1–4 lin. longis, bracteis minutis deltoideis. Perianthium campanulatum 2 lin. longum, segmentis obtusis sordide albidis purpureo suffusis dorso late purpureo vel demum brunneo carinatis. Filamenta lanceolata perianthio triente breviora. Stylus $\frac{1}{2}$ lin. longus, stigmate capitato. Capsula 3–4 lin. longa, seminibus in loculo interdum 4–6, valvis coriaceis persistentibus. *Cap. B. Spei,* Masson! Zeyher 739! 4281! Bolus 517! MacOwan 1888! Burchell 1995! Cooper 3310!

9. E. latifolium, *Jacq. Ic.* t. 420; *Willd. Sp.* ii. 110; *Schult. fil. Syst.* vii. 502; *Kunth, Enum.* iv. 652.—Ornithogalum capense, *Linn. Sp. Plant.* 441 (*Commelin, Hort. Amstel.* ii. t. 88). Tuber magnitudine ejus *Solani tuberosi* fuscum. Folium solitarium post scapum productum cordato-rotundum glabrum 2–3 poll. longum et latum, petiolo canaliculato 1–2-pollicari. Scapus gracilis firmus teres $\frac{1}{2}$–1-pedalis. Racemus laxissimus expansus interdum pedalis, pedicellis infimis 2–6 poll. longis. Bracteæ minutæ deltoideæ. Perianthium 2 lin. longum, segmentis anguste oblongis obtusis vel subacutis albis dorso brunneo vittatis. Stamina perianthio distincte breviora, filamentis lanceolatis. Ovula in loculo 6–8. Capsula turbinata 3–4 lin. longa. *Cap. B. Spei,* Masson! Zeyher 537! Burchell 2008! 4941! 5017! 8335!

10. E. Cooperi, *Baker.* Cormum non vidi. Folium solitarium ovatum acutum glabrum post scapum productum, petiolo elongato basin scapi amplectente. Scapus pedalis et ultra. Racemus densissimus 2–3 poll. longus, 8–9 lin. latus, pedicellis infimis 2–3 lin. longis. Bracteæ lanceolatæ, pedicellis æquilongæ, ante anthesin protrusæ. Perianthium campanulatum, 2 lin. longum, segmentis late oblongis obtusis, exterioribus purpureis, interioribus albidis. Stamina perianthio paulo breviora. *Cap. B. Spei in ditione Basutaland,* Cooper 3307!

11. E. albucoides, *Baker.* Cormus magnus, cortice griseo, 1 poll. crassus. Folium solitarium post scapum productum glabrum viride cordato-rotundum 2 poll. longum et latum, petiolo $\frac{1}{2}$–1-pollicar præditum. Scapus gracillimus semipedalis. Racemus laxus 10–12-

florus, expansus 2–3 poll. longus, 12–15 lin. latus, pedicellis erecto-patentibus 6–10 lin. longis. Bracteæ minutissimæ deltoideæ. Perianthium 2 lin. longum, segmentis flavis viridi carinatis, exterioribus oblongis obtusis, interioribus obovatis apice cucullatis conniventibus. Stamina perianthio duplo breviora, 3 exteriora lanceolata, 3 interiora breviora latiora. Stylus ovario æquilongus. Ovula in loculo plura. *Cap. B. Spei*, cult. in Hort. Kew. 1873, Cooper legit.

12. E. SPIRALE, *Berg. in Schult. Syst. Veg.* vii. 1696; *Kunth, Enum.* iv. 654.—Anthericum spirale, *Linn. Mant.* 224. Cormus globosus cortice cinereo. Folium post scapum productum ignotum. Scapus 2–3-pollicaris. Racemus corymbosus 2–8-florus, pedicellis 4–7 lin. longis, bracteis minutis ovatis. Perianthium 2 lin. longum, segmentis oblongis obtusis albis purpureo carinatis. Filamenta lanceolata. Capsula oblonga, seminibus clavatis densissime lanatis. *Cap. B. Spei*, Bergius.

13. E. ORNITHOGALOIDES, *Baker.* Cormus parvus obliquus. Folium post scapum productum ignotum. Scapus gracilis glaber fragilis 4–6-pollicaris. Racemus dense corymbosus, 4–6-florus, pedicellis ascendentibus 1–3 lin. longis, bracteis magnis deltoideis. Perianthium 4 lin. longum, segmentis albis purpureo carinatis oblongis obtusis. Stamina perianthio duplo breviora, filamentis lanceolatis. Ovarium globosum, stylo 1 lin. longo. *Natalia in ditione Pinetown, alt.* 1500 *pedum*, Sanderson 905!

14. E. CORYMBOSUM, *Baker.* Cormus oblongus apice fibris copiosis secus collum coronatus. Folium cum floribus productum solitarium cordato-oblongum vel rotundatum obtusum glabrum ½ poll. longum, petiolo basin scapi longe amplectente præditum. Scapus pollicaris. Racemus corymbosus 10–12-florus, pedicellis infimis 3–4 lin. longis, bracteis perminutis deltoideis. Perianthium campanulatum 2 lin. longum, segmentis obtusis albidis dorso late viridibus. Stamina perianthio triente breviora, filamentis applanatis. *C. B. Spei in ditione Transvaal in rupestribus ad Dutoitspan*, Tuck!

15. E. MACKENII, *Baker.*—Bulbine Mackenii, *Hook. fil. Bot. Mag.* tab. 5955. Cormus oblongus 1½ poll. crassus cortice griseo. Folia 2–3 cum racemo producta oblongo-spathulata acuta carnoso-subcoriacea viridia 3–4 poll. longa medio 18–21 lin. lata utrinque glabra, petiolo lato brevi basin scapi amplectente prædita. Scapus 6–12-pollicaris, teres, glaucus. Racemus laxus, 20–30-florus, expansus 4–5 poll. longus, 2 poll. crassus, pedicellis erecto-patentibus 8–12 lin. longis, bracteis lanceolatis persistentibus 1–1½ lin. longis. Perianthium infundibulare 4 lin. longum, segmentis oblanceolatis obtusis luteis viridi carinatis. Stamina perianthio triente breviora, antheris parvis oblongis, filamentis subulatis. Ovarium ovoideum, ovulis in

loculo 5–6, stylo filiformi 1½ lin. longo. *Natal*, MacKen! (v. v. in H. Kew.).

16. E. KIRKII, *Baker*. Cormus magnus tuberosus. Folia 2 cum racemo producta oblonga coriacea acuta utrinque glabra 5–6 poll. longa infra medium 1½–2 poll. lata basi cuneata, petiolo canaliculato erecto 2–3 poll. longo prædita. Scapus gracilis flexuosus 6–8-pollicaris. Racemus laxus expansus 3–4 poll. longus, pedicellis ascendentibus 3–9 lin. longis, bracteis persistentibus deltoideis. Perianthium infundibulare 3 lin. longum, segmentis albis brunneo-carinatis ligulatis. Stamina perianthio duplo breviora, antheris globosis, filamentis subulatis. Stylus 1 lin. longus, ovario æquilongus. Ovula in loculo gemina. Capsula 4 lin. longa, valvis coriaceis obovatis reflexis persistentibus. *Africa austro-occidentalis tropicalis in ditione fluminis Zambesi*, Dr. Kirk!

17. E. PARADOXUM, *Gawl. Bot. Mag.* t. 1382; *Schult. fil. Syst. Veg.* vii. 305; *Kunth, Enum.* iv. 654.—Ornithogalum paradoxum, *Jacq. Coll. Suppl.* 81, t. 1.—Thaumaza paradoxa, *Salisb. Gen.* 15. Cormus magnus difformis cortice fusco. Folium solitarium post scapum productum parvum rigidulum cordato-ovatum pilosum petiolatum basi cucullatum, a sinu basali processu erecto 3–4-pollicari ramis multis erecto-patentibus simplicibus vel pinnatis instructum. Scapus pilosus subpollicaris, floribus 6–7 brevissime pedicellatis, bracteis minutis ovatis. Perianthium 4 lin. longum, segmentis ellipticis obtusis albidis viridi carinatis. Stamina perianthio subduplo breviora, filamentis linearibus. Stylus 1½ lin. longus. *Cap. B. Spei.*

18. E. BOWIEANUM, *Baker*. Cormus magnus oblongus. Folium solitarium breviter petiolatum cordato-ovatum 5–6 lin. longum utrinque glabrum facie processibus multis clavatis erectis 3–6 lin. longis instructum. Scapus 1½–2-pollicaris, apice floribus 5–6 densis subspicatis instructus. Perianthium 2–2½ lin. longum, segmentis albidis erosis purpureo carinatis. Filamenta lanceolata. Stylus ovario æquilongus. *Cap. B. Spei.* Ex icone inedita Kewensi descriptum. Bowie in anno 1822 legit.

19. E. PROLIFERUM, *Baker*.—E. folioliferum, *Gawl. Bot. Reg.* t. 795; *Kunth, Enum.* iv. 654, *non Andrews.* Cormus depresso-globosus, cortice fusco. Folium post scapum productum solitarium lanceolatum glabrum petiolatum facie processibus multis filiformibus glabris erectis 1–1½ poll. longis instructum. Scapus 3–4 poll. longus. Racemus laxe 9–12-florus, expansus 2–3 poll. longus, pedicellis ascendentibus 3–9 lin. longis, bracteis minutis deltoideis. Perianthium campanulatum 2 lin. longum, segmentis albis obtusis viridi carinatis. Filamenta lanceolata segmentis duplo breviora. Stylus ovarium superans. *Cap. B. Spei.* (icon. inedit. bibl. Kew.; Bowie legit, anno 1821).

20. E. FOLIOLIFERUM, *Andr. Bot. Rep.* t. 521, *non Gawl. nec Kunth.*—Phylloglottis foliolifera, *Salisb. Gen.* 15. Cormus magnus difformis. Folium solitarium cum scapo productum petiolatum ovatum acutum basi rotundatum 2–2½ poll. longum, facie processibus pluribus erectis strigosis 3–10 lin. longis instructum, dorso purpureum. Scapus 6–15 poll. longus. Racemus laxe 6–9-florus, pedicellis erecto-patentibus 3–9 lin. longis, bracteis minutis deltoideis. Perianthium campanulatum 2 lin. longum, segmentis oblongis flavidis viridi carinatis. Filamenta linearia. Stylus ovario æquilongus. *Cap. B. Spei* (Hort. Hibberd, anno 1806).

3. ANEMARRHENA, *Bunge.*

Bunge, Enum. Pl. Chin. Bor. 66; *Endl. Gen.* No. 1139; *Kunth, Enum.* iv. 600.

Perianthium 6-partitum, ad finem infundibulare, segmentis ligulatis subæqualibus petaloideis dorso crebre trinervatis. *Stamina* 3, perianthio valde breviora, prope medium segmentorum interiorum inserta, filamentis brevissimis, antheris parvis oblongis versatilibus. *Ovarium* sessile globosum triloculare, ovulis in loculo geminis collateralibus ascendentibus. Stylus brevis filiformis rectus; stigma capitatum. *Capsula* globosa loculicide trivalvis, seminibus in loculo 1–2 triquetris, testa nigra, albumine copioso.

1. A. ASPHODELOIDES, *Bunge, loc. cit.* Rhizoma repens ½ poll. crassum, fibris radicalibus crassis copiosis. Folia 6–9 graminea glabra persistentia 6–15 poll. longa, 2–3 lin. lata, subtiliter nervata. Scapus erectus teres 1–2-pedalis, foliis paucis valde reductis bracteatus. Flores in spicam interruptam 6–9 poll. longam dispositi, fasciculati, pedicellis subnullis vel brevissimis apice articulatis. Bracteæ membranaceæ parvæ deltoideæ cuspidatæ. Perianthium 2–2 lin. longum, segmentis ½ lin. latis viridi vel fusco carinatis. *China borealis,* Bunge 373! Turczaninow! etc. *Japonia,* teste Miquel.

4. ASPHODELUS, *Linn.*

Linn. Gen. 421; *Endl. Gen.* No. 1141; *Kunth, Enum.* iv. 554.—Asphodeloides, *Moench, Meth.* 634.—Verinea *et* Clausonia, *Pomel, Bull. Soc. Bot. France,* ix. 673.—Ophioprason *et* Gethosyne, *Salisb. Gen.* 72.

Perianthium corollinum 6-partitum infundibulare, urceolo basilari brevi, segmentis 6 oblongo-ligulatis obtusis æqualibus dorso uninervatis semper ascendentibus. *Stamina* 6 inclusa ad oram urceoli hypogyna, filamentis inæquilongis leviter declinatis basi deltoideis circiter ovarium valvatis, supra basin filiformibus, antheris oblongis versatilibus 3 staminum breviorum paulo minoribus. *Ovarium* sessile globosum triloculare, ovulis in loculo geminis collateralibus; stylus filiformis ad oram perianthii attingens leviter declinatus: stigma punctiforme. *Capsula* loculicide trivalvis, seminibus in loculo 1–2 triquetris, testa crustacea opaca nigrogrisea, albumine copioso. *Herbæ acaules, foliis firmis linearibus, floribus copiose racemosis vel racemoso-paniculatis membranaceis albis fusco-carinatis, pedicellis medio vel apice articulatis.*

Subgenus GAMON, *Gay*. Herbæ robustæ perennes, foliis triquetris, scapo elongato.
  Species sola .... 1. *A. ramosus.*
Subgenus CLAUSONIA. Herba humilis perennis, foliis triquetris, scapo subnullo.
  Species sola .... 2. *A. acaulis.*
Subgenus VERINEA. Herbæ annuæ, foliis teretibus fistulosis, scapo elongato.
  Pedicelli medio articulati .... 3. *A. fistulosus.*
  Pedicelli prope basin articulati.
    Pedicelli ascendentes.. .... 4. *A. viscidulus.*
    Pedicelli reflexi .... 5. *A. pendulinus.*

1. A. RAMOSUS, *Linn. Sp. Plant.* 444; *Kunth, Enum.* iv. 555. Herba perennis, fibris radicalibus 3–4 poll. longis fusiformibus vel interdum napiformibus, collo radicis fibris setosis coronato. Folia plurima triquetra ensiformia glabra arundinacea viridia vel glauca 1–2 pedes longa, 6–18 lin. lata, ad apicem attenuata. Scapus $1\frac{1}{2}$–3-pedalis teres firmus glaber. Racemi densi simplices vel paniculati, terminalis semipedalis vel pedalis, expansus 2 poll. crassus. Pedicelli solitarii ascendentes 4–6 lin. longi prope medium articulati. Bracteæ lanceolatæ, inferiores 6–9 lin. longæ. Perianthium album infundibulare 8–10 lin. longum, segmentis ligulatis obtusis rubro vel viridi carinatis, interioribus 2 lin., exterioribus $1\frac{1}{2}$ lin. latis. Stamina inæqualia, filamentis longioribus perianthio æquilongis, antheris oblongis 2 lin. longis, brevioribus antheris duplo minoribus. Stylus filiformis demum exsertus. Capsulæ valvæ costis transversalibus pluribus præditæ. Semina in loculo 1–2 triquetra vel tetragona griseo-nigra 3–4 lin. longa.

Subspecies 3 primariæ adsunt cum formis permultis a cl. Jordanio in Bull. Soc. Bot. France, vol. 7, et Breviario et Iconibus suis descriptis et depictis.

Subspecies 1. A. CERASIFERUS, *J. Gay, Bull. Soc. Bot. France,* iv. 610; *Willk. et Lange, Fl. Hisp.* i. 204; *Mogg. Ment.* t. 69 A, B.—A. ramosus, *Gouan*; *Reich. Ic. Germ.* t. 1118.—A. albus, *Boiss. Voy. Esp.* 618. Racemi simplices vel parce ramosi. Bracteæ pallide fulvescentes. Filamenta basi in subulam cito cuneata. Capsula magna depresso-globosa umbilicata 8–10 lin. crassa. *Gallia et Hispania.* Formæ hujus subspeciei sunt A. proterophyllus, *Jord. Bull. France,* vii. 737, A. comosus, *Jord. Bull. France,* vii. 737, *Jord. et Fourr. Ic.* t. 182, A. grandiflorus, *Jord. et Fourr. Brev.* 124, A. Rouxii, *Jord. Bull. France,* vii. 738, A. procerus, *Jord. et Fourr. Brev.* 124, A australis, *Jord. et Fourr. Brev.* 124, A. virgatus, *Jord. Bull. France,* vii. 738, A. corsicus, *Jord. Bull. France,* vii. 739, *Jord. et Fourr. Icon.* t. 15, A. glaucescens, *Jord. Bull. France,* vii. 739, *Jord. et Four. Icon.* t. 177, A. validus, *Jord. Bull. France,* vii. 740.

Subspecies 2. A. ALBUS, *Miller, Dict.* edit. 6, No. 3; *J. Gay, Bull. Soc. Bot. France,* iv. 608; *Reich. Ic. Germ.* t. 1119; *Willk. et Lange, Fl. Hisp.* i. 204; *Parl. Fl. Ital.* ii. 601; *Mogg. Ment.* t. 69 C. Racemi simplices vel parce ramosi. Bracteæ novellæ fuscæ. Filamenta basi deltoidea. Capsula magnitudine mediocris subglobosa vel ellipsoidea, 5-6 lin. longa. *Ab Hispania ad Croatiam et Albaniam.* Formæ hujus subspeciei sunt A neglectus, *Schult. fil. Syst. Veg.* vii. 488, A. sphærocarpus, *Gren. Fl. Franc.* iii. 223, *Boreau, Fl. Cent.* ii. 618, *Jord. Bull. Soc. Bot. France,* vii. 731, *Jord. et Four. Icon.* t. 179, A. occidentalis, *Jord. Bull. France,* vii. 731, *Jord. et Four. Icon.* t. ii., A. pyrenaicus, *Jord. Bull. France,* vii. 732, *Jord. et Four. Icon.* t. 183, A. macrocarpus, *Parl. Fl. Ital.* ii. 604, A. delphinensis, *Gren., Jord. Bull. France,* vii. 732, *Jord. et Four. Icon.* t. 184, A. subalpinus, *Gren. Fl. Franc.* iii. 224, A. monticola, *Jord. Bull. France,* vii. 733, *Jord. et Four. Icon.* t. 12, A. Ozanoni, *Jord. Bull. France,* vii. 733, *Jord. et Four. Icon.* t. 13, et A. Deseglesei, *Jord. et Four. Brev.* 121.

Subspecies 3. A. MICROCARPUS, *Viviani, Linnæa,* i. 500; *Gay, Bull. Soc. Bot. France,* iv. 609; *Mogg. Ment.* tab. 69 D, *non Reich. Ic. Germ.* tab. 1116.—A. æstivus, *Brot. Fl. Lus.* i. 525; *Kunth, Enum.* iv. 557.—A. ramosus, *Sibth. & Sm. Fl. Græc.* t. 334.—A. Audebertii, *Requien in Roem. et Schult. Syst. Veg.* vii. 1695. Racemi copiose paniculati. Bracteæ novellæ pallide fulvescentes. Filamenta basi quadrata. Capsula parva obovoideo-globosa 3–4 lin. longa. *Ab Lusitania ad Egyptum et Syriam.* Formæ hujus subspeciei sunt A. crinipes, *Jord. Bull. Soc. Bot. France,* vii. 729, *Jord. et Four. Icon.* t. 185, A littoralis, *Jord. Bull. France,* vii. 729, A. affinis, *Parl. Fl. Ital.* ii. 597, et A. africanus, *Jord. Bull. France,* vii. 730, *Jord. et Four. Icon.* t. 186.

Formæ inter *album* et *cerasiferum* mediæ, racemis simplicibus, capsulis magnis ovoideo-globosis, bracteis sordide brunneis, filamentis basi quadratis, floratione præcoces sunt A. Villarsii, *Verlot, Jord. Bull.*

Soc. Bot. France, vii. 734, *Jord. et Four. Icones*, t. 178, A. cerasiferus intermedius, *J. Gay, Bull. Soc. Bot. France*, v. 250, A. fuscatus, *Jord. et Four. Brev.* 123, A. collinus, *Jord. et Four. Brev.* 123, et A. spicatus, *Desf. MSS.*

Formæ inter *album* et *cerasiferum* intermediæ, racemis ramosis, capsulis subgloboso-ovoideis 5–6 lin. longis, basi subimpressis, floratione serotinæ sunt A. ambigens, *Jord. Bull. Soc. Bot. France*, vii. 735, *Jord. et Four. Ic.* t. 181, A. tardiflorus, *Jord. Bull. France*, vii. 736, A. Chambeironi, *Jord. Bull. France*, vii. 736, *Jord. et Four. Icon.* t. 14, A. Morisianus, *Parl. Fl. Ital.* ii. 596, A. olbiensis, *Jord. et Four. Brev.* 122, et A. stœchadensis, *Jord. et Four. Brev.* 122.

2. A. ACAULIS, *Desf. Fl. Atlant.* i. 302, t. 89; *Schult. fil. Syst.* vii. 491; *Kunth, Enum.* iv. 560.—Clausonia acaulis, *Pomel, Bull. Soc. Bot. France*, ix. 673.—Gethosyne acaulis, *Salisb. Gen.* 72. Herba perennis, fibris radicalibus pluribus crassis 2–3 poll. longis. Folia 6–20 dense rosulata lineari-triquetra patula 3–4 poll. longa 1½ lin. crassa acuminata minute pubescentia. Scapus brevissimus vel subnullus. Flores 6–20 in corymbum confertum dispositi, pedicellis inferioribus 6–9 lin. longis, floriferis ascendentibus, fructiferis cernuis, apice articulatis. Bracteæ 6–15 lin. longæ lanceolatæ hyalinæ fusco-carinatæ. Perianthium erectum infundibulare 10–12 lin. longum, segmentis oblanceolatis albis fusco-carinatis supra medium 2–3 lin. latis. Stamina perianthio subduplo breviora, antheris oblongis 1 lin. longis. Capsula globosa 3–4 lin. crassa, seminibus nigrescentibus, dorso carinatis, lateribus puteolis 2–3 præditis. *Algeria*, Balansa 222! Kralik! 87! Bourgeau! Munby! etc.

3. A. FISTULOSUS, *Linn. Sp. Plant.* 444; *Cav. Ic.* t. 202; *Bot. Mag.* t. 984; *Red. Lil.* t. 178; *Sibth. & Sm. Fl. Græc.* t. 335; *Lodd. Bot. Cab.* t. 1124; *Kunth, Enum.* iv. 557.—Ophioprason fistulosum, *Salisb. Gen.* 72.—Verinea fistulosa, *Pomel, loc. cit.* Herba annua, fibris radicalibus copiosis gracilibus. Folia 12–30 dense rosulata filiformia fistulosa 6–12 poll. longa glabra erecta 1½–2 lin. crassa margine obscure papillosa. Scapus teres semipedalis, dimidio superiore ramosus, racemis 4–9 lin. longis deorsum laxis. Bracteæ inferiores lanceolatæ, superiores deltoideæ. Pedicelli solitarii erecto-patentes 2–3 lin. longi medio articulati. Perianthium infundibulare 6–7 lin. longum, segmentis oblanceolatis 1–2 lin. latis, exterioribus latioribus. Stamina perianthio triente breviora, antheris parvis oblongis. Capsula globoso-turbinata 2–3 lin. crassa, valvis transverse rugosis, seminibus trigonis fusco-nigris, dorso valleculis transversalibus 3–4, lateribus puteolis 3–4 præditis. *Ab Gallia et Lusitania ad Syriam, Arabiam et Afghanistan.*

Var. CLAVATUS, *Baker* (A. clavatus, *Roxb. Fl. Ind.* ii. 148; *Kunth, Enum.* iv. 559), est forma mera floribus minoribus. *Himalaya cen-*

tralis et occidentalis, Wall. Cat. 5050! etc. *Beloochistan,* Stocks 287! *Concan,* Stocks 185!

Var. TENUIFOLIUS, *Baker.*—A. tenuifolius, *Cav. Annal. Scienc.* iii. (1801) 46, tab. 27. fig. 2; *Icon.* t. 587. fig. 2; *Kunth, Enum.* iv. 558. —A. intermedius, *Hornem. Hafn. Suppl.* 131.—A. æstivus, *Reich. Pl. Crit.* t. 451.—A. microcarpus, *Reich. Ic. Germ.* tab. 513. fig. 1116, *non Viv.*—A. parviflorus, *Wt. Icon.* t. 2062. Varietas tropicalis et subtropicalis, foliis gracilioribus interdum puberulis margine magis papillosis, floribus multo minoribus (3–4 lin. longis), capsulis duplo minoribus (1½ lin. crassis). *Ab insulis Fortunatis et Mauritania ad Egyptum, Indiam peninsularem et Mauritium et insulam Rodriguez.*

4. A. VISCIDULUS, *Boiss. Diagn.* vii. 118, xiii. 24. Herba annua habitu omnino *A. fistulosi.* Folia 10–12 rosulata digitalia pallida subulata ½ lin. crassa prorsus viscidula. Scapi 1–2 filiformes simplices vel furcati. Racemus brevis parviflorus laxus. Bracteæ minutæ deltoideæ. Pedicelli basi articulati ascendentes, fructiferi 2–3 lin. longi. Perianthium 1½–2 lin. longum, segmentis oblanceolatis vix 1 lin. latis. Filamenta ubique lævia. Capsula globosa turbinata, valvis transverse rugosis, seminibus 1 lin. longis, dorso costatis, lateribus puteolo singulo præditis. *Arabia petræa,* Schimper 237. *Egyptus prope Ramleh,* Boissier.

Var. MICRANTHUS, *Baker.*—A. micranthus, *Coss. et Durieu in Kralik, Pl. Tunet.*—A. viscidulus, var. Gabesianus, *J. Gay,* est varietas robustior caulibus pluribus divaricatis, pedicellis fructiferis gracillimis 3–4 lin. longis. *Tunis in pascuis deserti Gabes,* Kralik!

5. A. PENDULINUS, *Coss. et Durieu in Jamin Pl. Alger. Exsic.* No. 57 (1852); *J. Gay, Bull. Soc. Bot. France,* iv. 497.—A. refractus, *Boiss. Diagn.* xiii. 23 (1854). Herba annua, fibris radicalibus gracilibus. Folia 15–20 rosulata teretia fistulosa 5–6 poll. longa basi ½–1 lin. crassa dense viscida. Scapi plurimi patuli, ramis pluribus elongatis flexuosis gracilibus. Racemi laxissimi 4–9 poll. longi. Pedicelli floriferi ascendentes, fructiferi deflexi 3–6 lin. longi prope basin articulati. Bracteæ parvæ hyalinæ deltoideæ. Perianthium infundibulare 1½–2 lin. longum, segmentis oblanceolatis albis brunneo carinatis. Stamina perianthio triente breviora, filamentis papillosis. Capsula globoso-turbinata 1½–2 lin. crassa, valvis transverse rugosis. Semina 1½ lin. longa grisea dorso costata puteolis laterum nullis. *Arabia petræa,* Major Macdonald! *Algeria,* Cosson! Jamin! Balansa 745! Kralik!

5. Asphodeline, *Reich.*

Reich. Fl. Germ. Excurs. 116; *Endlich. Gen.* no. 1142; *Kunth, Enum.* iv. 560.—Dorydium, *Salisb. Gen.* 72.—Asphodeli sp., *Linn. et auct. mult.*

Perianthium corollinum 6-partitum, segmentis oblanceolato-spathulatis subæqualibus, dorso distincte vittatis marcescentibus, basi in urceolum brevem concretis, flore expanso supra ovarium patulis. *Stamina* 6, inclusa, filamentis ad oram urceoli insertis basi deltoideis circiter ovarium valvatis, supra basin subulatis, distincte declinatis, 3 interioribus sæpissime multo longioribus, antheris oblongis versatilibus, staminum breviorum minoribus. *Ovarium* sessile globosum triloculare, ovulis in loculo sæpissime geminis erectis; stylus filiformis declinatus, ad oram perianthii attingens; stigma capitatum. *Capsula* coriacea globosa vel obovoidea, loculicide trivalvis, seminibus in loculo sæpissime triquetris 2 testa crassa crustacea griseo-brunnea, albumine corneo. *Herbæ altæ monocarpicæ stoloniferæ, caulibus foliatis vel nudis, foliis perplurimis siccis lineari-subulatis basi membranaceo-dilatatis, floribus albis vel luteis viridi vittatis dense racemosis, bracteis membranaceis persistentibus, pedicellis medio articulatis.*

Subgenus Dorydium. Caulis infra inflorescentiam simplex. Stamina valde inæqualia.

Caulis ad basin inflorescentiæ foliatus.
Perianthium luteum .... 1. *A. lutea.*
Perianthium album .... 2. *A. taurica.*
Caulis dimidio vel triente inferiore foliatus.
Perianthium album. Racemus densus .... 3. *A. globifera.*
Perianthium luteum. Racemi laxi.
Bracteæ magnæ .... 4. *A. tenuior.*
Bracteæ parvæ deltoideæ leviter cuspidatæ... 5. *A. liburnica.*
6. *A. brevicaulis.* 7. *A. ambigua.*
Caulis basi tantum foliatus. Perianthium album. Racemi densi.
Racemi sæpissime simplices .... 8. *A. parviflora.*
9. *A. damascena.* 10. *A. Balansæ.*
11. *A. prismatocarpa.*
Racemi copiose paniculati .... 12. *A. rigidifolia.*
13. *A. isthmocarpa.*

Subgenus DENDRASPHODELINE. Caulis medio ramosus. Stamina subæqualia.

Species sola.. .... 14. *A. prolifera.*

1. A. LUTEA, *Reich. Fl. Germ. Excurs.* 116; *Ic. Germ.* t. 517; *Led. Ross.* iv. 193; *Kunth, Enum.* iv. 561.—Asphodelus luteus, *Linn. Sp. Plant.* 443; *Jacq. Vind.* t. 77; *Bot. Mag.* t. 773; *Red. Lil.* t. 223.—A. tauricus, *Lodd. Bot. Cab.* t. 1102. Longe stolonifera, fibris radicalibus crassis carnosis dense cæspitosis 6–9 poll. longis. Caulis simplex strictus erectus 2–3-pedalis, ad basin racemi foliatus, foliis siccis subulatis, ascendentibus, 3–12 poll. longis, 1–2 lin. crassis margine scabris, in vaginam basalem magnam caulem amplectentem dilatatis. Racemus densus, 6–18 poll. longus, expansus 3 poll. latus. Bracteæ magnæ membranaceæ ovatæ cuspidatæ persistentes distincte carinatæ. Pedicelli inferiores 2–5ni, fructiferi stricti erecto-patentes, 12–15 lin. longi medio articulati. Perianthium luteum viridi vittatum 1 poll. longum, segmentis oblanceolatis 1½–3 lin. latis. Stamina longiora perianthio paulo breviora. Capsula oblonga 5–6 lin. longa, seminibus in loculo duobus. *Italia, Mauritania et Algeria ad Tauriam et Arabiam.* Var. SIBIRICUS, *Lindl. Bot. Reg.* t. 1507, est forma caule humiliore, floribus præcocioribus minoribus, bracteis minoribus.

2. A. TAURICA, *Kunth, Enum.* iv. 561; *Led. Fl. Ross.* iv. 193.—Asphodelus tauricus, *Pall. Nov. Act. Petrop.* x. 309; *M. Bieb. Flor. Taur. Cauc.* i. 279, iii. 268; *Willd. Enum.* 370: *Delile in Red. Lil.* t. 470, *non Lodd. Bot. Cab.* t. 1102. Fibræ radicales graciles dense fasciculatæ. Caulis simplex strictus erectus 1–2-pedalis ad basin racemi dense foliatus, foliis ascendentibus subulatis 3–9 poll. longis basi amplexicaulibus late membranaceo-marginatis. Racemus sæpissime simplex densus, 6–12 poll. longus, expansus 1½–2 poll. latus. Bracteæ ovatæ cuspidatæ, 9–12 lin. longæ, flores occultantes. Pedicelli inferiores fasciculati 6–9 lin. longi, fructiferi stricti ascendentes medio articulati. Perianthium 8–9 lin. longum, segmentis oblanceolato-spathulatis albis viridi vittatis 1–1½ lin. latis. Stamina distincte inæqualia, longiora perianthio paulo breviora. Capsula subglobosa, 4 lin. longa, valvis demum subplanis rugosis, seminibus in loculo geminis. *Caucasus, Tauria, Syria, Asia Minor, Græcia,* Balansa 819! Kotschy 499! Aucher-Eloy 2161! etc.

3. A. GLOBIFERA, *J. Gay in Balansa, Pl. Orient. Exsic.* anno 1856. Fibræ radicales semipedales modice crassæ. Caulis strictus supra basin 6–9 lin. crassus 2–3-pedalis triente inferiore dense foliatus, superne nudus. Folia densissima subulata, inferiora 5–6 poll. longa supra basin 1–1½ lin. lata, superiora multo graciliora, omnia basi deltoidea

membranacea. Pedunculus nudus strictus sesquipedalis 3–4 lin. crassus. Racemus densissimus 1–1½-pedalis. Bracteæ membranaceæ 9–12 lin. longæ lanceolatæ basi deltoideæ. Pedicelli fructiferi stricti ascendentes 6–18 lin. longi, supra medium articulati, inferiores 5–6ni. Perianthium album 9–10 lin. longum, segmentis oblanceolatis 1½–2 lin. latis. Stamina valde inæquilonga. Capsula globosa 3 lin. longa, valvis dorso convexis longitudinaliter corrugatis, seminibus geminis triquetris. *Cappadocia inter montes Ali Dagh et Kara-dagh, alt.* 4000 *pedum,* Balansa!

4. A. TENUIOR, *Led. Fl. Ross.* iv. 193.—Asphodelus tenuior, *Fisch. Cat. Gorenk.* 1812, 9; *M. Bieb. Flor. Taur. Cauc.* iii. 268; *Bot. Mag.* t. 2626.—A. tenuiflorus, *K. Koch, Linnæa,* xxii. 261.—Asphodeline cretica, *Kunth, Enum.* iv. 562, *ex parte, non Vis.* Fibræ radicales graciles, 3–4 poll. longæ. Caulis simplex pedalis strictus dimidio inferiore foliato, superiore nudo. Folia laxa subulata ascendentia 3–4 poll. longa ½ lin. crassa, prope medium caulis magis conferta, basi amplexicaulia deltoidea scariosa. Racemus simplex laxus 3–4 poll. longus, expansus 2 poll. latus. Bracteæ scariosæ 6–12 lin. longæ, basi deltoideæ vel lanceolatæ, longe cuspidatæ. Pedicelli ascendentes, 6–9 lin. longi, medio articulati, inferiores gemini. Perianthium luteum viridi carinatum, 9–12 lin. longum, segmentis supra medium 1½–2 lin. latis. Stamina valde inæquilonga, filamentis nullo modo papillosis. Capsula globosa 3 lin. longa, valvis dorso corrugatis, seminibus apice truncatis. *Caucasus, Armenia, Persia borealis,* Zohrab! Szovits 386! etc. A. SZOVITSII, *K. Koch, Linn.* xxii. 261 (A. persicus, *Fisch.*), est varietas caule graciliore, racemo interdum ramoso.

5. A. LIBURNICA, *Reich. Fl. Germ. Excurs.* 116; *Ic. Germ.* tab. 516, fig. 1120.—Asphodelus liburnicus, *Scop. Carn.* i. 245, t. 12; *Jacq. Eclog.* 113, t. 77.—Asphodeline cretica, *Vis. Dalm.* i. 152; *Kunth, Enum.* iv. 562, *ex parte.*—Asphodelus creticus, *Lam. Ency.* i. 300; *Lodd. Bot. Cab.* t. 915.—Asphodelus capillaris, *Red. Lil.* t. 380.—Asphodeline capillaris, *Kunth, Enum.* iv. 562.—Asphodelus æstivus, *Brigant. Stirp. Rar.* i. 5, *non Brot.* Fibræ radicales crassæ carnosæ, 4–6 poll. longæ. Caulis simplex erectus strictus 1–2-pedalis dimidio superiore nudo. Folia supra basin densissima ascendentia subulata 3–4 poll. longa ½ lin. crassa basi deltoidea scariosa amplexicaulia. Pedunculus nudus strictus, semipedalis et ultra. Racemus sæpissime simplex laxus 6–9 poll. longus, expansus 2½–3 poll. latus, 10–30-florus. Bracteæ parvæ 1½–2 lin. longæ deltoideæ cuspidatæ. Pedicelli infimi 6–9 lin. longi, 4–6ni, prope basin articulati. Perianthium luteum, viridi vittatum, segmentis 1½–3 lin. latis. Stamina distincte inæquilonga, filamentis basi dilatata pilosis. Capsula globosa 4 lin. longa, valvis dorso convexis plicis pluribus horizontalibus corrugatis.

seminibus geminis erectis triquetris. *Græcia, Creta, Dalmatia, Istria, Italia* (*non Asia Minor*).

6. A. BREVICAULIS, *Gay in Balans. Pl. Orient. Exsic.* 1855, No. 816.—Asphodelus brevicaulis, *Bert. Nov. Com. Acad. Bon.* v. 430 (Misc. i. 20); *Walp. Ann.* i. 867.—Asphodeline cretica, *Boiss. in Pinard, Pl. Car. Exsic., non Vis.*—Fibræ radicales graciles 3–6 poll. longæ. Caulis simplex gracilis sæpe flexuosus triente vel dimidio inferiore foliatus, superne nudus. Folia subulata ascendentia, inferiora 4–6 poll. longa ½–1 lin. crassa. Racemi sæpe paniculati, ramis strictis vel flexuosis patulis vel ascendentibus. Racemus laxus, centralis 4–8 poll. longus, expansus 2 poll. latus, pedicellis 3–6 lin. longis infra medium articulatis. Perianthium luteum viridi vittatum 8–9 lin. longum, segmentis exterioribus 1½ lin. latis. Bracteæ deltoideæ aristatæ 2–3 lin. longæ. Capsula globosa 2½–3 lin. longa, valvis dorso convexis plicis 5–6 transversalibus corrugatis, seminibus geminis erectis triquetris apice haud truncatis. *Asia Minor*, Pinard! Boissier! Balansa 816! Forbes 641! Aucher-Eloy 1210! *Syria prope Aleppo*, Russell! *Palæstina*, Lowne! Roth! *Ad ripas fluminis Euphratis*, Chesney 163! *Egyptus*, Aucher-Eloy 1209!

7. A. AMBIGUA, *Gay, Herb.* Fibræ radicales densæ 4–5 poll. longæ superne carnosæ. Caulis pedalis simplex gracilis, dimidio superiore nudo. Folia subulata gracillima ascendentia 3–4 poll. longa basi amplexicaulia membranaceo-marginata prope medium caulis conferta, inferne laxa. Pedunculus nudus strictus 4–6-pollicaris. Racemus laxus simplex 3–5-pollicaris, bracteis minutis membranaceis deltoideis aristatis, pedicellis infimis geminis strictis erecto-patentibas 4–6 lin. longis prope basin articulatis. Perianthium luteum, 9–10 lin. longum, segmentis supra medium 1½ lin. latis. Stamina inæquilonga. Capsula globosa 3 lin. longa, valvis corrugatis dorso convexis, seminibus in loculo geminis erectis triquetris. *Patria ignota*, Hort. Paris. anno 1858. V. s. in herb. Gay!

8. A. PARVIFLORA, *Baker*. Fibræ radicales duræ graciles dense fasciculatæ. Caulis strictus erectus semipedalis, apice 3–4 lin. crassus, basi tantum foliatus. Folia in rosulam basalem dense conferta ascendentia subulata 6–8 poll. longa, supra basin membranaceo-dilatatam 1 lin. lata. Racemus densissimus simplex 4–5 poll. longus, expansus 15 lin. latus. Bracteæ lanceolatæ basi deltoideæ 9–12 lin. longæ. Pedicelli medio articulati, inferiores dense fasciculati, 6–9 lin. longi. Perianthium albidum 6–7 lin. longum, segmentis supra medium 1 lin. latis. Stamina valde inæquilonga. Capsulam non vidi. *Constantinople*, Lady Liston!

9. A. DAMASCENA, *Baker*. Asphodelus damascenus, *Boiss. Diag.* xiii. 22. Fibræ radicales densæ graciles duræ. Caulis simplex strictus 1½-2-pedalis, apice 3 lin. crassus, prope basin tantum foliatus. Folia in

rosulam basalem dense conferta subulata ascendentia 6–9 poll. longa basi dilatata, supra basin 1 lin. lata. Racemus sæpissime simplex densus 6–12 poll. longus expansus 1½–2 poll. latus. Bracteæ membranaceæ lanceolatæ, infimæ 9–12 lin. longæ. Pedicelli fructiferi 6–9 lineas longi stricti ascendentes medio articulati, inferiores 4–5ni. Perianthium albidum 9–12 lin. longum, segmentis 1½–2 lin. latis. Stamina valde inæquilonga. Capsula turbinata 4½–6 lin. longa, valvis plicis transversalibus distinctis corrugatis. Semina matura non vidi. *Libani pars superior*, Boissier! *Antilibanus*, Gaillardot!

10. A. Balansæ, *Gay in Balansa, Pl. Orient. Exsic.* anno 1855, no. 817. Fibræ radicales densæ graciles. Caulis simplex strictus bipedalis, apice 3–4 lin. crassus, basi tantum foliatus. Folia subulata ascendentia 6–9 poll. longa glaucescentia basi membranaceo-dilatata, supra basin 1 lin. crassa. Racemus simplex densus 6–15 poll. longus, expansus 2–2½ poll. latus. Bracteæ scariosæ lanceolatæ 6–9 lin. longæ. Pedicelli stricti ascendentes medio articulati, infimi 5–6ni, 9–12 lin. longi. Perianthium albidum viridi vittatum, 9–10 lin. longum, segmentis 1½–2 lin. latis. Stamina valde inæquilonga. Capsula turbinata 4–4½ lin. longa, apice umbilicata, valvis dorso convexis acute carinatis plicis pluribus distinctis transversalibus corrugatis, seminibus apice truncatis. *Cilicia in regione montana Tauri, alt.* 2500–6000 *pedum*, Balansa!

11. A. prismatocarpa, *Gay in Balansa, Pl. Orient. Exsic.* anno 1855. Fibræ radicales graciles semipedales. Caulis simplex strictus bipedalis apice 3–4 lin. crassus basi tantum foliatus. Folia prope basin caulis dense congesta ascendentia subulata semipedalia 1 lin. crassa glaucissima basi membranaceo-dilatata. Racemus densissimus simplex interdum pedalis, expansus 2½–3 poll. latus. Pedicelli dense fasciculati, inferiores 9–12 lin. longi, medio articulati. Bracteæ lanceolatæ scariosæ 2–6 lin. longæ. Perianthium album viridi carinatum 9–10 lin. longum, staminibus valde inæquilongis. Capsula 5–6 lin. longa oblonga prismatico-trigona, valvis dorso acute carinatis plicis 3–4 transversalibus præditis, capsulæ loculis apice cavis, seminibus geminis parvis triquetris. *Taurus, in regione subalpina montis Alla-dagh*, Balansa!

12. A. rigidifolia, *Baker*.—Asphodelus rigidifolius, *Boiss. Diag.* xiii. 22. Caulis simplex strictus pedalis vel sesquipedalis, apice 2–3 lin. crassus, basi tantum foliatus. Folia subulata ascendentia semipedalia ad basin caulis dense rosulata basi dilatata supra basin ¾–1 lin. lata margine distincte denticulata. Racemi copiose paniculati, ramis arcuatis. Racemus centralis densus 4–6 poll. longus, expansus 2–2½ poll. latus. Bracteæ lanceolatæ longe cuspidatæ, inferiores 9–12 lin. longæ. Pedicelli fructiferi stricti ascendentes 6–9 lin. longi supra basin articulati, inferiores 3–4ni. Perianthium albidum 7–8 lin.

longum, segmentis 1–1½ lin. latis. Stamina valde inæquilonga. Capsula globosa 3 lin. longa, valvis dorso convexis plicis 3–4 transversalibus corrugatis. Semina matura non vidi. *Asia Minor, in collibus apricis prope Konieh,* De Heldreich!

13. A. ISTHMOCARPA, *Gay in Balan. Pl. Orient. Exsic.* anno 1855, no. 818. Fibræ radicales graciles 3–4 poll. longæ. Caulis simplex strictus bipedalis, apice 3–4 lin. crassus, basi tantum foliatus. Folia prope basin caulis dense conferta ascendentia subulata 6–9 poll. longa 1–1½ lin. crassa, basi membranaceo-dilatata. Racemi copiose paniculati, ramo centrali pedali vel sesquipedali, floribus dense dispositis. Pedicelli dense fasciculati, stricti ascendentes, inferiores 9–12 lin. longi, prope medium articulati. Perianthium album 9–10 lin. longum, segmentis oblanceolatis 1½–2½ lin. latis. Stamina valde inæquilonga. Bracteæ lanceolatæ 6–9 lin. longæ. Capsula obovoideo-oblonga 4–4½ lin. longa apice profunde carinata, valvis dorso convexis plicis distinctis transversalibus nullis apice emarginatis, capsulæ loculis apice cavis, seminibus duobus apice oblique truncatis. *Tauri regio montana, in valle Boulgarmaden et ad latera montis Masmenen et in collibus prope Cæsaream,* Balansa!

14. A. PROLIFERA, *Kunth, Enum.* iv. 563, *Led. Fl. Ross.* iv. 193.—Asphodelus prolifer, *M. Bieb. Flor. Taur. Cauc.* i. 280, iii. 269.—Anthericum dendroides, *Steven, Mem. Mosq.* iii. 249; *Hoffm. Comm. Mosq.* i. 1, t. 43. Fibræ radicales gracillimæ. Caulis 6–18-pollicaris, supra medium sæpissime ramosus, ramis 2–6 nudis gracilibus ascendentibus apice parce racemosis. Folia subulata ascendentia 3–8 poll. longa vix ½ lin. crassa supra basin caulis laxe disposita evanescentia prope medium dense conferta basi deltoidea amplexicaulia membranacea. Pedunculus nudus strictus 3–6-pollicaris. Racemi laxe 4–12-flori 2–4 poll. longi. Bracteæ 3–4 lin. longæ deltoideæ aristatæ. Pedicelli solitarii vel infimi gemini, fructiferi stricti ascendentes 3–4 lin. longi, medio articulati. Perianthium album 3–4 lin. longum, filamentis subæquilongis. Capsula globosa 2 lin. longa, seminibus in loculo geminis erectis. *Iberia, Georgia, Persia borealis,* Hohenacker! Szovits 212! etc.

6. EREMURUS, *M. Bieb.*

M. Bieb. Pl. Ross. ii. t. 61; *Endl. Gen.* No. 1140; *Kunth, Enum.* iv. 553; *Regel, Descr. Pl. Nov.* fasc. i. p. 22.—Henningia, *Karel. et Kirilow, Mosc. Bull.* 1842, 517; *Kunth, Enum.* iv. 692; *Regel, Enum. Semenow,* 132.—Ammolirion, *Karel. et Kirilow, Mosc. Bull.* 1842, 515; *Kunth, Enum.* iv. 692.—Asphodeli sp., *Pallas, etc.*

Perianthium 6-partitum corollinum infundibulare vel raro campanulatum, segmentis conformibus petaloideis ligulatis vel oblongis dorso nervis tribus confertis in carinam concretis præditis. *Stamina* 6 subhypogyna, filamentis filiformibus subæquilongis inclusis vel exsertis ante anthesin induplicatis demum subrectis, antheris parvis oblongis versatilibus. *Ovarium* sessile globosum triloculare, ovulis in loculo 4–6; stylus filiformis inclusus vel exsertus sæpe declinatus; stigma punctiforme. *Capsula* membranacea globosa loculicide trivalvis, seminibus in loculo 2–4 prismaticis angulis acutis vel interdum alatis, testa crustacea nigra vel grisea, albumine corneo. *Herbæ perennes, fibris radicalibus fasciculatis carnosis, foliis anguste linearibus in rosulam basalem confertis, scapo elongato nudo, floribus copiose racemosis albis vel luteis, pedicellis sæpissime apice articulatis.*

Subgenus EREMURUS VERUS. Stamina expansa perianthio 2–3-plo longiora.
Pedicelli apice distincte articulati .... 1. *E. altaicus.*
Pedicelli inarticulati.
Perianthium albidum .... 2. *E. tauricus.*
Perianthium ochroleucum .... 3. *E. spectabilis.*
4. *E. turkestanicus.*

Subgenus AMMOLIRION. Stamina expansa perianthio paulo longiora.
Bracteæ subulatæ...... 5. *E. cappadocicus.* 6. *E. stenophyllus.*
Bracteæ lineares .... 7. *E. inderiensis.*

Subgenus HENNINGIA. Stamina expansa perianthio æquilonga vel breviora.
Stamina perianthio subæquilonga.
Bracteæ subulatæ............................. 8. *E. Olgæ.*
9. *E. angustifolius.*
Bracteæ lineari-subulatæ pedicellis æquilongæ.
10. *E. Kaufmanni.* 11. *E. Aucherianus.*
Bracteæ lineari-subulatæ pedicellis breviores.
Perianthium album........................ 12. *E. himalaicus.*
13. *E. Stocksii.* 14. *E. Griffithii.*
Perianthium roseum..................... 15. *E. robustus.*
Stamina perianthio distincte breviora.
Perianthium album. 16. *E. persicus.* 17. *E. anisopterus.*
Perianthium luteum .... 18. *E. aurantiacus.*

1. E. ALTAICUS, *Stev. Bull. Mosc.* ii. 255 ; *Led. Fl. Ross.* iv. 191 ; *Lall. Ind. Sem. Petrop.* xi. 68 ; *Regel, Enum.* 28.—Asphodelus altaicus, *Pallas, Act. Petrop.* 1783, p. 258, t. 10.—Eremurus spectabilis, *Led. Fl. Alt.* ii. 25 ; *Kunth, Enum.* iv. 554, *ex parte*. Fibræ radicales carnosæ dense fasciculatæ 2–3 poll. longæ, collo parce setoso. Folia 9–12 ligulata suberecta arundinacea 6–9 poll. longa 3–6 lin. lata, margine lævia vel asperiuscula. Scapus teres 2–3 lin. crassus pedalis vel sesquipedalis. Racemus subdensus 6–9 poll. longus, expansus 1½ poll. latus. Bracteæ lineari-subulatæ 3–4 lin. longæ. Pedicelli apice articulati fructiferi stricti ascendentes, infimi 6–9 lin. longi. Perianthium campanulatum ochroleucum, segmentis obtusis 1–1½ lin. latis. Stamina perianthio subtriplo longiora, antheris parvis oblongis. Stylus filiformis declinatus 4–5 lin. longus. Capsula globosa 2–2½ lin. longa lævis, seminibus sæpe duobus irregulariter tetragonis angulis angustissime alatis. *Altai, Songaria, Turkestania et ad montes Thian Shan.*

2. E. TAURICUS, *Stev. Bull. Mosc.* iv. 253 ; *Led. Ross.* iv. 191.—E. spectabilis, var. tauricus et variegatus, *Lall. Ind. Sem. Petrop.* xi. 68 ; *Regel, Enum.* 26.—Fibræ radicales carnosæ dense fasciculatæ. Folia 6–9 læte viridia lorata sesquipedalia acuta supra medium 9–18 lin. lata ad basin angustata margine lævia vel asperiuscula. Scapus strictus validus bipedalis. Racemus densus 12–18 poll. longus expansus 2 poll. latus. Bracteæ lanceolatæ longe cuspidatæ 6–9 lin. longæ. Pedicelli inarticulati, floriferi arcuati, fructiferi stricti ascendentes 6–9 lin. longi. Perianthium infundibulare campanulatum albidum 6 lin. longum, segmentis 1–1½ lin. latis. Stamina perianthio duplo longiora, antheris oblongis ½ lin. longis. Stylus declinatus 6–7 lin. longus. Capsula major quam in *E. caucasico*, apice mucronata, valvis magis rugosis, seminibus majoribus præsertim longioribus griseis nigro-maculatis vittis transversis fuscis variegatis, angulis anguste alatis. *Tauria, Persia borealis, Songaria, Turkestania.*

3. E. SPECTABILIS, *M. Bieb. Flor. Taur. Cauc.* iii. 269 ; *Cent. Ross.* t. 61 ; *Bot. Mag.* t. 4870 ; *Sweet, Brit. Flow. Gard.* t. 188 ; *Kunth, Enum.* iv. 554, *ex parte*.—E. spectabilis, var. typicus, *Regel, Enum.* 26. —E. spectabilis, var. caucasicus, *Lall. Ind. Sem. Petrop.* xi. 68.—E. caucasicus, *Stev. Bull. Soc. Mosc.* iv. 251 ; *Led. Fl. Ross.* iv. 190.—E. libanoticus, *Boiss. Diagn.* ii. iv. 98. Fibræ radicales crassæ carnosæ 2–3 poll. longæ dense fasciculatæ, collo setis paucis prædito. Folia 6–15 suberecta lorata acuta glaucescentia 12–18 poll. longa, supra medium 6–12 lin. lata, ad basin sensim angustata, margine lævia vel asperiuscula. Scapus teres strictus 3–4 lin. crassus 13 -pedalis. Racemus densus 12–18 poll. longus, expansus 2 poll. latus. Bracteæ lineari-subulatæ, infimæ 6–12 lin. longæ. Pedicelli inarticulati, flo-

riferi arcuati, fructiferi stricti ascendentes 6–12 lin. longi. Perianthium ochroleucum, infundibulari-campanulatum, 5–6 lin. longum, segmentis ligulatis obtusis 1–1½ lin. latis. Stamina demum perianthio duplo longiora, filamentis purpureis, antheris oblongis ½ lin. longis. Capsula globosa mucronata 4 lin. longa, plicis transversalibus rugosa, seminibus in loculo sæpe duobus triquetris nigris maturis vix alatis. *Tauria, Caucasus, Turcomania. Persia borealis,* Kotschy 321! Aucher-Eloy 5381! *Asia Minor,* Balansa 1325! *Armenia,* Zohrab! *Kurdistan,* Brant! *Syria ad Libanum et Antilibanum,* Labillardière, Reygasse.

4. E. TURKESTANICUS, *Regel, Descrip.* 27. Folia linearia glabra, margine lævia. Scapus 8–16-pollicaris. Racemus densus 12–16 poll. longus. Bracteæ lanceolatæ longe aristatæ villoso-ciliatæ, pedicellis vix æquilongæ. Pedicelli apice inarticulati, a basi supra medium erecto-patentes, apicem versus subclavato-incrassati recurvato-patentes. Perianthium ut videtur albidum, segmentis post florescentiam eximie supra medium involutis, exterioribus basi 5-nerviis, interioribus uninerviis. Filamenta crassa atropurpurea longe exserta. Capsula lævis. *Turkestania, alt.* 3000–11,000 *pedum,* Fedjenko, Korolkow. (Non vidi.)

5. E. CAPPADOCICUS, *J. Gay, MSS.*—Asphodelus glaucus, *Aucher-Eloy, Pl. Orient. Exsic.* No. 2166.—Fibræ radicales carnosæ, collo dense fibroso. Folia 8–10 anguste lorata glaucescentia 7–8 poll. longa, 1½–2 lin. lata firma, margine asperiuscula. Scapus subpedalis puberulus. Racemus densiflorus 5–6 poll. longus, expansus 1 poll. latus. Bracteæ subulatæ pedicellis floriferis æquilongæ. Pedicelli ascendentes, floriferi 3–5 lin. longi, apice articulati. Perianthium infundibulare sordide album 4½–5 lin. longum, segmentis ligulatis obtusis 1 lin. latis dorso late distincte viridi vittatis. Filamenta perianthio paulo longiora. Stylus leviter declinatus 6–7 lin. longus. Capsulam non vidi. *Cappodocia meridionalis,* Aucher-Eloy 2166! 2332.

6. E. STENOPHYLLUS, *Baker.*—Ammolirion stenophyllum, *Boiss. et Buhse, Reise Transcauc.* 218.—Fibræ radicales carnosæ, collo dense fibroso. Folia glaucescentia subtriquetra acutiuscula 5–6 poll. longa, 2 lin. lata. Scapus sesquipedalis. Racemus densiusculus 3–4 poll. longus. Bracteæ subulatæ, pedicellis duplo breviores. Pedicelli patuli apice articulati 6–8 lin. longi. Perianthium 4 lin. longum, filamentis demum segmentis sesqui longioribus. Capsula globosa magnitudine pisi, seminibus triquetris margine angustissime alatis. *Persia borealis inter Ask et Firuskuh,* Buhse 1099.

7. E. INDERIENSIS, *Regel, Descrip.* 27.—Asphodelus inderiensis, *Stev. Bull. Mosc.* iv. 257; *Mém. Soc. Nat. Mosc.* ix. 99.—Eremurus spectabilis, var. inderiensis, *M. Bieb. Flor. Taur. Cauc.* iii. 270.—Ammolirion Steveni, *Kar. et Kiril. Bull. Mosc.* 1842, 515; *Kunth, Enum.*

iv. 691, *Led. Fl. Ross.* iv. 191. Fibræ radicales tenuiter carnosæ, collo fibroso. Folia anguste lorata pedalia 3–4 lin. lata margine scabriuscula, facie glabra vel minute puberula. Scapus folia duplo superans. Racemus densiusculus 6–9 poll. longus, expansus 1 poll. latus. Bracteæ lanceolatæ 3–4 lin. longæ fusco carinatæ. Pedicelli inarticulati ascendentes 2–3 lin. longi. Perianthium albidum cylindrico-campanulatum 4–5 lin. longum, segmentis ligulatis obtusis distincte brunneo carinatis. Stamina perianthio paulo longiora. Stylus distincte exsertus declinatus 5–6 lin. longus. Capsula globosa 3 lin. longa, valvis lævibus, seminibus in loculo 3–4 cinereis angulis anguste alatis. *Siberia uralensis et altaica, Songaria, Turkestania.*

8. E. Olgæ, *Regel Descr. Pl. Nov. Turkest.* 30. Folia glabra anguste linearia margine scabra 8–12 poll. longa, 7–8 lin. lata. Scapus 8–12-pollicaris. Racemus densus 8–16-pollicaris. Bracteæ glabræ filiformes breves basi tantum scariosæ. Pedicelli continui patentes bracteis 2–3plo longiores. Perianthium albidum, segmentis nervo solitario fuscescente percursis. *Turkestania,* Fedjenko, Krause. (Non vidi.)

9. E. angustifolius, *Baker.*—Henningia angustifolia, *J. Gay, MSS.* Folia 1½ lin. lata, facie glabra, margine asperula. Caulis bipedalis basi laxe puberulus. Racemus pedalis. Bracteæ subulatæ glabræ 4–6 lin. longæ. Pedicelli patuli apice articulati, inferiores 10–12 lin. longi. Perianthium albidum cernuum 6 lin. longum, segmentis oblongis dorso 1-nervatis fusco carinatis, exterioribus 2 lin., interioribus 3–3½ lin. latis. Filamenta demum perianthio subæquilonga. Stylus declinatus exsertus 7–8 lin. longus. Ovula in loculo 4–6. Capsula ignota. *Persia,* Aucher-Eloy 2168! et plantæ verisimiliter affinis exemplum unicum adest in Herb. Kew. floribus et foliis ignotis, bracteis 5–6 lin. longis ab imo basi subulatis, pedicellis patulis bracteas duplo superantibus, capsulæ valvis persistentibus oblongis 4 lin. longis 2 lin. latis dorso supra carinam excavatam bullatis, septis crassis membranaceis. *Afghanistan,* Griffith 5799!

10. E. Kaufmanni, *Regel, Descr. Pl. Nov. Turkest.* 30. Folia anguste linearia utrinque hirtula 7–10 poll. longa 3–6 lin. lata. Scapus 15–20 poll. longus, basi tantum puberulus. Racemi densi 6–12 poll. longi. Pedicelli inarticulati, per florescentiam bracteis lineari-filiformibus basi scariosis margine villoso-ciliatis æquilongi vel parum breviores. Perianthium ut videter pallide sulphureum, segmentis nervo solitario fusco vittatis. *Turkestania alt.* 4500–8500 *pedum,* Fedschenko. (Non vidi.)

11. E. Aucherianus, *Boiss. Diagn.* vii. 120; *Boiss. et Buhse, Reise Trans. Cauc.* 217; *Regel, Descrip.* 29.—Henningia Aucheriana, *Boiss. Diagn.* ii. iv. 98; *Regel, Enum. Semenow,* 132. Fibræ radicales

carnosæ dense fasciculatæ, collo radicis parce setoso. Folia 8–9 anguste ligulata glabra 8–9 poll. longa, 3–4 lin. lata, facie canaliculata. Scapus teres gracilis bipedalis. Racemus densus 4–6 poll. longus, expansus 12–15 lin. latus. Bracteæ lineari-subulatæ 3–4 lin. longæ. Pedicelli floriferi ascendentes inarticulati 2–3 lin. longi. Perianthium infundibulare dilute roseum, 5–6 lin. longum, segmentis ligulatis obtusis 1½ lin. latis dorso fusco vittatis trinervatis. Filamenta perianthio æquilonga, antheris oblongis 1 lin. longis. Stylus leviter exsertus. Capsula magna globosa, valvis lævibus, seminibus distincte alatis. *Persia prope Ispahan,* Aucher-Eloy 5382! Buhse 1325. *Kokania in montibus Karatau, alt.* 3600 *pedum,* Sewerzow.

Var? BUHSEI, *Baker,* planta 3–4-pedalis, ab typo dicitur recedere bracteis brevioribus, floribus luteis. *Persia inter Jesd et Isfahan,* Buhse 1422. Verisimiliter species propria (cf. Boiss. et Buhse, loc. cit.).

12. E. HIMALAICUS, *Baker.* Fibræ radicales carnosæ dense fasciculatæ 3–4 poll. longæ, collo radicis dense fibroso. Folia 9–12 ligulata acuta firma persistentia glabra pedalia vel sesquipedalia supra medium 6–15 lin. lata. Scapus 1½–2-pedalis teres glaber 3–6 lin. crassus. Racemus densus 1–2-pedalis, expansus 3–3½ poll. latus. Bracteæ membranaceæ lineari-subulatæ 3–4 lin. longæ. Pedicelli ascendentes 9–15 lin. longi apice articulati. Perianthium album infundibulare 7–8 lin. longum, segmentis oblongis flore expanso supra basin patulis 2–2½ lin. latis dorso nervo fusco angusto distincte vittatis. Filamenta perianthio æquilonga. Stylus leviter exsertus. Capsula globosa 5–6 lin. longa, valvis 4–5 lin. latis dorso rugosis subtiliter reticulatis, seminibus triquetro-tetragonis nigris angulis acutis exalatis. *Regio temperata Himalayæ occidentalis* (*Lahul, Kunawar etc., alt.* 7000–10,000 *pedum*), Thomson! Royle! Jacquemont 558! Falconer 1089! Jaeschke 85! *Kashgar,* Bellew!

13. E. STOCKSII, *Baker.* Folia pedalia 3–4 lin. lata facie glabra margine scabrula. Scapus 1½–2-pedalis puberulus. Racemi densi, fructiferi 9–12 poll. longi, 2 poll. lati. Bracteæ subulatæ, basi solum applanatæ, 5–6 lin. longæ. Pedicelli apice articulati, fructiferi patuli 9–12 lin. longi. Perianthium albidum (?) 5–6 lin. longum, segmentis distincte fusco-carinatis 1¼ lin. latis. Stamina demum perianthio æquilonga. Capsula globosa 4–4½ lin. longa, valvis dorso lævibus turgidis, seminibus in loculo 3–4 brunneis triquetris distincte alatis. *Beloochistan,* Stocks 1057!

14. E. GRIFFITHII, *Baker.* Folia subpedalia 6–8 lin. lata linearia persistentia ubique puberula. Scapus teres puberulus. Racemus densissimus 6–8 poll. longus, floriferus expansus 2 poll. latus. Bracteæ lanceolatæ 3–4 lin. longæ dense ciliatæ. Pedicelli ascendentes vel inferiores floriferi patuli apice articulati 6–7 lin. longi. Perianthium 7–8 lin. longum, segmentis flore expanso supra basin patulis

albis oblanceolato-spathulatis 1½ lin. latis graciliter brunneo vittatis. Filamenta perianthio demum subæquilonga. Stylus 3–4 lin. exsertus. Capsulam non vidi. *Afghanistan*, Griffith 5803!

15. E. ROBUSTUS, *Regel, Gartenfl.* xxii. 257, t. 769, *Descrip. Plant. Nov.* 28.—Henningia robusta, *Regel, Enum. Semenow*, 134. Folia glauca glaberrima bipedalia lineari-ligulata 1½–2 poll. lata margine sub lente denticulis recurvis scabrula. Scapus strictus 3–4-pedalis. Racemus densus 1–2-pedalis, expansus 4–4½ poll. latus, rachi crassa rugosa. Bracteæ lineares ciliatæ 3-4 lin. longæ demum reflexæ. Pedicelli erecto-patentes 12–18 lin. longi apice inarticulati. Perianthium infundibulare 7–8 lin. longum, segmentis roseis viridi vittatis oblongo-spathulatis 2–2½ lin. latis. Filamenta perianthio æquilonga, antheris oblongo-ligulatis. Stylus vix exsertus. *Alatau transiliensis, alt.* 2000–3000 *pedum*, Semenow. *Turkestania, alt.* 10,000 *pedum*, Fedjenko. *In monte Karamkul*, Krause.

16. E. PERSICUS, *Boiss. Diag.* vii. 119; *Regel, Descr.* 30.—Asphodelus persicus, *Jaub. et Spach, Ill. Pl. Orient.* t. 102.—Henningia persica. *Regel, Enum. Semenow*, 132.—E. velutinus, *Boiss. et Buhse, Reise Transcauc.* 217.—Fibræ radicales carnosæ crassæ, interdum 6–9 lin. longæ, collo radicis densissime setoso. Folia 12–18 suberecta anguste linearia 3–6 lin. lata pedalia persistentia utrinque puberula. Scapus puberulus teres crassus ½–1½-pedalis. Racemi 6–12 poll. longi, superne densi, inferne laxi, floriferi 2–2½ poll., fructiferi 3–4 poll. lati. Bracteæ lanceolateæ 6–9 lin. longæ albidæ nervo fusco vittatæ. Pedicelli apice articulati, floriferi ascendentes, fructiferi patuli 12–15 lin. longi. Perianthium 6–7 lin. longum, segmentis oblongis supra basin patulis albis distincte brunneo carinatis 1½–2 lin. latis. Filamenta perianthio distincte breviora. Stylus declinatus 4–5 lin. longus. Capsula globosa 8–9 lin. longa, valvis lævibus, seminibus in loculo 3–4 triquetris 5–6 lin. longis angulis distincte alatis. *Persia*, Aucher-Eloy 5383! Buhse 1423, Loftus! *Beloochistan*, Stocks 912! *Afghanistan*, Griffith 5802! 5801!

17. E. ANISOPTERUS, *Regel, Descrip.* 29.—Henningia anisoptera, *Kar. et Kir. Bull. Soc. Mosc.* xv. 517; *Regel, Enum. Semenow*, 132. Fibræ radicales graciles. Folia anguste linearia 12–15 poll. longa, 2–3 lin. lata, facie glabra, margine obscure scabrula. Scapus 1–2-pedalis superne glaber, basi puberulus. Racemus laxus 6–9 poll. longus, expansus 2–2¼ poll. latus. Bracteæ membranaceæ demum reflexæ 3–4 lin. longæ, dorso fusco carinatæ. Pedicelli inarticulati, floriferi ascendentes 10–12 lin. longi. Perianthium campanulatum 6 lin. longum, segmentis oblongis 2½–3 lin. latis albis distincte fusco carinatis, nervo supra basin dilatato diviso. Filamenta perianthio duplo breviora, Stylus declinatus 4 lin. longus demum exsertus. Capsula depresso-

globosa 8–9 lin. lata, valvis subcarnosis, medio sulco leviter impresso notatis, seminibus sordide lutescentibus maculis et vittis fuscescentibus variegatis angulis distincte alatis. *Songaria orientalis in collibus sabulosis,* Karelin et Kirilow 2017! *Turkestania,* Lehmann!

18. E. AURANTIACUS, *Baker.* Fibræ radicales graciles, collo radicis dense setoso. Folia 5–6 anguste linearia erecta persistentia pedalia, 2–3 lin. lata, nervis omnibus scabris. Scapus sesquipedalis teres puberulus. Racemus densus semipedalis, floriferus expansus 18–20 lin. latus. Bracteæ subulatæ filiformes 5–6 lin. longæ. Perianthium 5–6 lin. longum, segmentis flore expanso supra basin patulis oblanceolato-spathulatis $1\frac{1}{2}$–$2\frac{1}{2}$ lin. latis saturate flavis, nervo distincto brunneo vittatis. Filamenta perianthio distincte breviora. Stylus declinatus perianthio æquilongus. Capsulam non vidi. *Afghanistan,* Griffith 5800!

7. SELONIA, *Regel.*

Pl. Semen. 134, t. 6; *Bull. Soc. Mosc.* 1868, 457, t. 8.

Perianthium infundibulare 6-partitum marcescens, segmentis oblanceolatis obtusis uninervatis, exterioribus tribus sepaloideis, interioribus albis petaloideis. *Stamina* 6 profunde perigyna, filamentis filiformibus glabris ante anthesin induplicatis, post anthesin longe exsertis, antheris versatilibus oblongis. *Ovarium* subglobosum triloculare, ovulis in loculo 3–5; stylus elongatus filiformis declinatus; stigma punctiforme. *Capsula* loculicide trivalvis, loculis 1–2-spermis, seminibus triquetris angustissime alatis, testa nigra. *Ab* Eremuro *solum recedit segmentis exterioribus sepaloideis.*

1. S. SOOGDIANA, *Regel, loc. cit.*; *Descr. Plant. Nov. fasc.* i. 31. Herba perennis, radicibus carnoso-fibrosis fasciculatis. Folia omnia radicalia, pedem et ultra longa, $1\frac{1}{2}$–4 lin. lata linearia carinata utrinque glabra vel scabra minute hirtula. Scapus pedalis et ultra, minute hirtulus. Racemus laxus subpedalis, expansus 2 poll. latus. Bracteæ minutæ deltoideæ cuspidatæ membranaceæ fusco carinatæ. Pedicelli 12–18 lin. longi, initio recti, deinde apice cernui. Perianthium 5–6 lin. longum, segmentis exterioribus lanceolatis, interioribus magis oblongis fusco vittatis. Stamina perianthio duplo longiora. *Turkestania,* Sewerzow, Fedjenko.

8. METANARTHECIUM, *Maxim.*

Maxim. in Bull. Acad. Imp. St. Péters. vi. 213.

Perianthium 6-partitum marcescens luteum, segmentis linearibus conformibus ascendentibus dorso 1-nervatis late viridi vittatis sursum flore expanso patulis. *Stamina* 6 profunde perigyna, filamentis leviter applanatis perianthio paulo brevioribus, antheris parvis oblongis versatilibus introrsis. *Ovarium* magnum sessile conicum triloculare, ovulis in loculo pluribus crebris; stylus brevis rectus cylindricus, stigmate capitato. *Capsula* sessilis ovoidea loculicide trivalvis, septis crassis, seminibus perplurimis minutis discoideis nitide brunneis exappendiculatis. *Habitus* Narthecii, *sed recedit filamentis glabris, seminibus exappendiculatis.*

1. M. LUTEO-VIRIDE, *Maxim. loc. cit.* Perennis, rhizomate brevi crasso præmorso, fibris radicalibus gracilibus plurimis prædito. Folia 6–12 rosulata membranacea persistentia oblanceolata glabra acuta vel subobtusa 3–4 poll. longa, supra medium 6–12 lin. lata, costa crassa, venis primariis verticalibus venulis reticulatis obviis connexis. Scapus 6–9-pollicaris, stramineus, nudus, simplex vel raro furcatus. Racemi densissimi, 3–5 poll. longi, expansi 7–8 lin. crassi. Bracteæ lineares 2–3 lin. longæ. Pedicelli inarticulati ascendentes 1–1½ lin. longi. Perianthium campanulatum 3–4 lin. longum. Capsula perianthio brevior, stylo persistente 1 lin. longo coronata. *Japonia in pratis siccis subalpinis*, Maximowicz!

9. PARADISEA, *Mazz.*

Mazzuc. Viag. Alp. Giul. 27 (1814); *Bert. Fl. Ital.* iv. 142.—Czackia, *Andrz. Diss.* (anno 1818) *cum icone*; *Kunth, Enum.* iv. 593.—Liliastrum, *Tourn. Inst.* i. 369, t. 194.—Allobrogia, *Tratt. Fl. Austr.* 184.—Antherici sp., *Linn.*—Phalangii sp., *Lam.*

Perianthium corollinum 6-partitum marcescens, segmentis diu ascendentibus subæqualibus oblongo-spathulatis unguiculatis dorso nervis tribus distantibus præditis. *Stamina* 6 hypogyna inclusa, filamentis 6 inæquilongis leviter declinatis, antheris versatilibus inæquilongis. *Ovarium* oblongum obtuse trigonum triloculare substipitatum, ovulis in loculo crebris horizontalibus; stylus filiformis leviter declinatus, apice stigmatoso capitato. *Capsula* oblonga obtuse trigona mucronata loculicide trivalvis, seminibus crebris parvis subcompressis, testa nigra crustacea, albumine carnoso.

1. P. LILIASTRUM, *Bert. Ital.* iv. 133.—Czachia Liliastrum, *Andrz. loc. cit. Reich. Ic. Germ. tab.* 509. fig. 1111.—Liliastrum album, *Link, Handb.* i. 173; *Parl. Ital.* ii. 614.—Hemerocallis Liliastrum, *Linn. Sp. Plant. edit.* i. 344.—Anthericum Liliastrum, *Linn. Sp. Plant.*

edit. ii. 445; *Bot. Mag.* t. 318.—Phalangium Liliastrum, *Lam. Ency.* v. 545; *Red. Lil.* t. 255. Fibræ radicales graciles 2–3 poll. longæ, collo fibroso. Folia 6–8 firma glabra ascendentia anguste linearia subpedalia 1½–2 lin. lata ad apicem sensim angustata. Scapus nudus simplex gracilis teres 1–2-pedalis. Racemi laxi secundi 2–10-flori. Pedicelli solitarii inarticulati 3–6 lin. longi, floriferi infimi cernui, fructiferi stricti ascendentes. Bracteæ lanceolatæ 6–9 lin. longæ. Perianthium album 18–21 lin. longum, segmentis supra medium 3–5 lin. latis. Stylus 15–18 lin. longus. Capsula firma 8–9 lin. longa, valvis convexis dorso subtiliter reticulatis. *Europa meridionalis et centralis a Gallia et Lusitania ad Poloniam et Carinthiam.*

10. HERPOLIRION, *Hook. fil.*

Hook. fil. Flor. New Zeal. i. 258; *Fl. Tasm.* ii. 54, *tab.* 132 *B.*

Perianthium infundibulare corollinum 6-partitum cæruleum vel albidum, segmentis oblanceolatis diu ascendentibus, exterioribus firmioribus ante anthesin valvatis per totam latitudinis nervatis, interioribus latioribus magis membranaceis medio laxe trinervatis. *Stamina* 6 inclusa profunde perigyna, filamentis subulatis puberulis, antheris parvis oblongis versatilibus. *Ovarium* globosum sessile triloculare, ovulis in loculo pluribus: stylus filiformis subrectus, stigmate punctiformi. *Fructum* non vidi.

1. H. NOVÆ-ZELANDIÆ, *Hook. fil. Flor. New Zeal.* i. 258; *Handb.* 287; *F. Muell. Frag.* vii. 68.—H. tasmaniæ, *Hook. fil. Fl. Tasm. loc. cit.* Perennis, rhizomate gracili reptante copiose ramoso, fibris radicalibus duris gracilibus 1½–2 poll. longis prædito. Folia 6–8 disticha congesta suberecta glabra coriacea linearia, exteriora 1½–2 poll. longa 1–1½ lin. lata, subtiliter verticaliter nervata, interiora valde reducta, lanceolata spathæformia. Flos in centro rosulæ sessilis, perianthio 6–8 lin. longo, segmentis 1½–2 lin. latis obtusis. Stamina perianthio subduplo breviora, antheris luteis ½ lin. longis. Stylus 3 lin. longus. *Montes Novæ Zelandiæ, Tasmaniæ et Australiæ orientalis meridionalis.*

11. XERONEMA, *Brong. & Gris.*

Brong. et Gris in Bull. Soc. Bot. France, xi. 317; *Nouv. Ann. Mus.* iv. 2, *tab.* 1.—Scleronema, *Brong. et Gris in Ann. Sc. Nat.* v. ii. 166, *non Benth.*

Perianthium corollinum rubrum 6-partitum infundibulare, segmentis 6 conformibus linearibus ascendentibus dorso 1-nervatis. *Stamina* 6 hypogyna, filamentis filiformibus æquilongis demum paullo exsertis, antheris parvis oblongis versatilibus. *Ovarium* stipitatum ovoideum triloculare, ovulis in loculo 8–10: stylus filiformis, apice stigmatoso obscure tricuspidato. *Capsula* membranacea loculicide trivalvis, seminibus minutis turgidis margine papillis cylindricis exasperatis, testa nigra crustacea, albumine copioso carnoso.

1. X. MOOREI, *Brong. et Gris loc. cit.* Fibræ radicales tenues. Folia 6–8 more *Iridis* disticha deorsum margine interiore cava vaginantia ensiformia dura sesquipedalia supra basin 9–12 lin. lata acuta conspicue multinervata. Scapus 1½-2-pedalis, foliis pluribus reductis bracteatus. Racemus secundus densiflorus 4–6-pollicaris. Bracteæ scariosæ oblongæ vel lanceolatæ 3–6 lin. longæ. Pedicelli patentes inarticulati 1–2 lin. longi. Perianthium splendide rubrum 6–7 lin. longum, segmentis vix ultra lineam latis. Filamenta rubra 7–8 lin. longa. *Nova Caledonia in montibus Miu, Dianæ etc. alt. circiter* 3000 *pedum, C. Moore, F. Mueller, Vieillard* 1358! *Deplanche* 158!

12. ECHEANDIA, *Ortega.*

Ortega, Decad. 90; *Endl. Gen. No.* 1158; *Kunth, Enum.* iv. 627. —Antherici sp., *Cav.*—Conantheræ, sp., *Pers.*

Perianthium corollinum 6-partitum album vel luteum, segmentis oblongis teneris marcescentibus dorso crebre 3–5-nervatis flore expanso patulis, interioribus latioribus. *Stamina* 6 hypogyna, filamentis liberis filiformibus perianthio subtriplo brevioribus, antheris ligulatis concretis filamento æquilongis facie longitudinaliter dehiscentibus. *Ovarium* oblongum sessile triloculare, ovulis in loculo pluribus crebris horizontalibus; stylus filiformis, stigmate capitato. *Capsula* membranacea loculicide trivalvis, seminibus multis crebris triquetris, testa crustacea nigra, albumine copioso. *Habitus omnino* Antherici *et* Phalangii, *sed recedit antheris concretis.*

1. E. TERNIFLORA, *Ortega, Dec.* 90; *Red. Lil.* t. 313; *Lindl. Bot. Reg.* xxv. *Misc.* 90; *Kunth, Enum.* iv. 627.—Anthericum reflexum, *Cav. Ic.* t. 241.—Phalangium reflexum, *Poir. Encyc.* v. 250.—Conanthera Echeandia, *Pers. Synops.* i. 370; *Link et Otto, Ic.* v. t. 3. Fibræ radicales dense fasciculatæ 3–4 poll. longæ, deorsum carnoso-incrassatæ, collo radicis fibroso. Folia radicalia plurima linearia subplana arundinacea glauco-viridia crebre nervata 12–18 poll. longa, 6–9 lin. lata, ad apicem angustata. Caulis ramosus, cum racemis 2–4-pedalis. Racemi laxissimi 6–12 poll. longi, pedicellis floriferis cernuis medio articulatis, inferioribus 4–6 lin. longis 2–3nis, raro 4–

6nis. Bracteæ inferiores lanceolatæ, superiores deltoideæ. Perianthium armeniaco-luteum, 6 lin. longum, segmentis teneris 1½ lin. latis flore expanso reflexis dorso crebre trinervatis raro 5-nervatis. Stamina perianthio distincte breviora, antheris luteis 2–2½ lin. longis diu concretis. Capsula oblongo-trigona, apice umbilicata, valvis dorso distincte carinatis crebre reticulatis. *Mexico*, Pavon! Galeotti 244! 5366! (forma reducta alpestris) 5377! Coulter 1561! Botteri 1185! *Guatemala*, Schott! *Columbia*, Fendler 1549! Lobb 33! Funck et Schlim 674! *Guiana britannica*, Sir. R. Schomburgk! E. ALBIFLORA *Kunth, Enum.* iv. 628 (Conanthera albiflora, *Schlecht. et Cham. Linn.* vi. 50; E. leucantha, *Klotzsch*), est varietas ramosa floribus albidis foliis margine scabris. E. HAENKEANA, *Kunth, Enum.* iv. 629 (Phalangium ramosissimum, *Presl, Rel. Haenk.* ii. 127), ex descriptione non potui segregare.

13. HODGSONIOLA, *F. Muell.*

F. Muell. Fragm. ii. 176, vii. 71.—Hodgsonia, *F. Muell. Fragm.* ii. 95, *non Hook. fil.*

Perianthium sub-6-partitum, cæruleum, segmentis lanceolatis subæqualibus distincte trinervatis, post anthesin more *Cæsiæ* insigniter spiraliter contortis. *Stamina* inclusa, filamentis brevibus basi applanatis profunde perigynis, antheris tribus ligulatis magnis more *Echeandiæ* concretis, facie longitudinaliter dehiscentibus, tribus minutis abortivis. *Ovarium* sessile globosum triloculare, ovulis in loculo paucis superpositis; stylus filiformis, stigmate capitato. *Capsula* obovoidea sessilis coriacea superne profunde obtuse trilobata, tarde loculicide dehiscens, seminibus in loculo 1–2 turgidis basi arillo albido carnoso instructis, testa crustacea nigra, albumine copioso carnoso.

1. H. JUNCIFORMIS, *F. Muell. loc. cit.* Perennis, rhizomate brevi, foliis 2–3 exterioribus brevibus brunneis scariosis applanatis, unico centrali scapo æquilongo tereti glabro ½ lin. crasso. Scapus simplex gracilis flexuosus 1½–2-pedalis. Racemus superne densus, inferne laxus, 3–5 poll. longus, expansus 1 poll. latus. Bracteæ lanceolatæ acuminatæ albæ fusco-carinatæ 2–3 lin. longæ. Pedicelli diu ascendentes, 3–6 lin. longi, apice articulati. Perianthium cæruleum 4 lin. longum, nervis segmentorum interiorum in carinam concretis, exteriorum magis diffusis. Antheræ luteæ acutæ 2 lin. longæ. Capsula magnitudine pisi. *Australia occidentalis*, Drummond! Oldfield! Preiss!

14. Anthericum, *Linn.*

Linn. Gen. 422; *Endl. Gen.* No. 1145, *non Juss.*—Phalangium, *Juss. Gen.* 52; *Kunth, Enum.* iv. 593.—Bulbinella, *Kunth, Enum.* iv. 569.—Trachyandra, *Kunth, Enum.* iv. 573.—Dilanthes, *Salisb. Gen.* 70.—Cæsia *et* Chlorophytum, *Kunth, ex parte.*—Schœnolirion, *Torrey, Bot. Mex. Bound.* 220.—Pessularia *et* Liliago, *Salisb. Gen.* 70.

Perianthium corollinum 6-partitum, segmentis albis vel luteis raro cæruleis marcescentibus flore expanso patulis vel reflexis dorso 1–5-nervatis sæpe distincte carinatis. *Stamina* 6 inclusa profunde perigyna, filamentis subulatis glabris vel papillosis rectis, antheris luteis oblongis versatilibus. *Ovarium* triloculare sessile vel breviter stipitatum globosum, ovulis in loculo interdum geminis collateralibus erectis, interdum paucis vel pluribus horizontalibus superpositis; stylus filiformis rectus vel leviter declinatus; stigma punctiforme. *Capsula* membranacea globosa obtuse angulata loculicide trivalvis, seminibus triquetris, testa nigra crustacea, albumine carnoso. *Herbæ sæpissime perennes, fibris radicalibus dense fasciculatis, foliis sæpe firmis raro carnosulis, floribus parvis vel mediocribus racemosis sæpe paniculatis, bracteis membranaceis persistentibus, pedicellis medio vel apice articulatis.*

Clavis stirpium.

Ovula in loculo gemina.
  Racemi densi simplices segmentis dorso 1-nervatis.
    Folia angustata........................ I. *Bulbinella.*
    Folia lata .... II. *Chrysobactron.*
  Racemi laxi sæpe paniculati segmentis dorso 3–5-nervatis.
    Flores albi, segmentis rectis.............. III. *Schœnolirion.*
    Flores cærulei, segmentis post anthesin tortis. IV. *Streptanthera.*
Ovula in loculo plura superposita.
  Flores in corymbum sessilem dispositi .... V. *Holopodium.*
  Flores laxe racemoso-paniculati.
    Filamenta glabra .... VI. *Phalangium.*
    Filamenta muricata.
      Pedicelli apice articulati .... VII. *Trachyandra.*
      Pedicelli medio articulati.
        Segmenta dorso crebre carinato-nervata.. VIII. *Dilanthes.*
        Segmenta dorso laxe nervata .... IX. *Hesperanthes.*

Series I. *Ovula in loculo gemina erecta.*

Subgenus I. BULBINELLA. Racemi simplices sæpe densi. Segmenta sæpissime uninervata. Filamenta glabra. Folia filiformia vel anguste linearia.

Folia filiformia $\frac{1}{4}$–$\frac{1}{2}$ lin. crassa 1–3-nervata.

  Segmenta dorso uninervata.

    1. *A. triquetrum.* 2. *A. Aitoni.* 3. *A. peronatum.*

  Segmenta dorso 3–5-nervata .... 4. *A. ornithogaloides.*

Folia $\frac{1}{2}$–1 lin. lata 5-7-nervata.

    5. *A. ciliolatum.* 6. *A. nutans.* 7. *A. gracile.*

Folia anguste linearia 2–3 lin. lata 10–12-nervata.

  Perianthium sulphureum.................. 8. *A. Cauda-felis.*

  Perianthium aurantiacum .... 9. *A. setosum.*

Subgenus II. CHRYSOBACTRON. Racemi simplices sæpe densissimi. Segmenta dorso uninervata. Folia lata carnosula.

  Perianthium albidum .... 10. *A. carnosum.*

  Perianthium saturate luteum.

    Folia linearia .... 11. *A. Hookeri.*

    Folia lanceolata. 12. *A. Rossii.* 13. *A. floribundum.*

Subgenus III. SCHŒNOLIRION. Racemi laxi sæpe furcati. Segmenta dorso 3–5-nervata. Cormus tuberosus.

  Species sola .... 14. *A. croceum.*

Subgenus IV. STREPTANTHERA. Racemi laxissimi simplices vel paniculati.

Scapi ebracteati.

  Brevicaules racemis subsimplicibus.

    15. *A. scilliflorum.* 16. *A. Zeyheri.* 17. *A. brevifolium.*

    18. *A. brevicaule.*

  Longicaules racemis copiose paniculatis. 19. *A. Burkei.*

Scapi foliis bracteati.

    20. *A. Dregeanum.* 21. *A. contortum.*

Series II. *Ovula in loculo pauca vel plura superposita.*

Subgenus V. HOLOPODIUM. Flores in corymbum sessilem dispositi. Pedicelli inarticulati.

    22. *A. humile.* 23. *A. angustifolium.*

Subgenus VI. PHALANGIUM. Flores racemoso-paniculati. Filamenta glabra. Pedicelli medio articulati. Segmenta dorso laxe nervata.

  Europæa. 24. *A. ramosum.* 25. *A. Liliago.*

Africana tropicalia.

Flores dense spicati .... 26. *A. drimiopsis.*

Flores racemoso-paniculati.

Folia facie glabra.

27. *A. nubicum.* 28. *A. pubirachis.* 29. *A. zanzibaricum.*

30. *A. gramineum.* 31. *A. subpetiolatum.* 32. *A. caulescens.*

Folia facie pubescentia.

33. *A. Grantii.* 34. *A. sphacelatum.*

Capensia.

Scapi subteretes foliis reductis bracteati.

35. *A. rigidum.* 36. *A. undulatum.*

Scapi subteretes ebracteati.

37. *A. pachyphyllum.* 38. *A. Cooperi.* 39. *A. longistylum.*

Scapi acute ancipites ebracteati.

40. *A. anceps.* 41. *A. angulicaule.*

Americana.

Folia facie glabra.

42. *A. nanum.* 43. *A. brasiliense.* 44. *A. glaucum.*

45. *A. ecercmortrizum.*

Folia ciliolata .... 46. *A. ciliatum.*

Folia pilosa. 42. *A. nanum,* var. *rude.* 47. *A. vestitum.*

Subgenus VII. TRACHYANDRA. Flores racemoso-paniculati.

Filamenta muricata. Pedicelli solitarii, apice articulati.

Folia anguste subteretia.

Scapi glabri.

Folia spiraliter contorta .... 48. *A. flexifolium.*

Folia recta.

Collum radicis squamis cinctum.

49. *A. pudicum.* 50. *A. Jacquinianum.*

51. *A. longepedunculatum.*

Collum radicis dense setosum ... 52. *A. Macowani.*

Scapi pilosi.

53. *A. Saltii.* 54. *A. pubescens.* 55. *A. canaliculatum.*

Scapi muricato-scabri.

56. *A. scabrum.* 57. *A. asperatum.*

Folia plana glabra.

58. *A. hispidum.* 59. *A. falcatum.*

60. *A. involucratum.* 61. *A. revolutum.*

Folia plana distincte ciliata.

62. *A. longifolium.* 63. *A. ciliatum.*

Folia plana facie scabra vel pilosa.
64. *A. thyrsoideum.* 65. *A. muricatum.*
66. *A. Gerrardi.* 67. *A. hirsutum.*

Folia parva apice urceolata .... 68. *A. paradoxum.*

Subgenus VIII. DILANTHES. Flores racemoso-paniculati. Filamenta muricata. Pedicelli medio articulati. Segmenta dorso carinata crebre nervata.
69. *A. nidulans.* 70. *A. Cameroni.*

Africana tropicalia.

Capensia.

Racemi simplices.
71. *A. triflorum.* 72. *A. Schultesii.*
73. *A. Brehmeanum.* 74. *A. fasciculatum.*

Racemi copiose paniculati.
75. *A. pulchellum.* 76. *A. viscosum.*

Subgenus IX. HESPERANTHES. Flores racemoso-paniculati. Filamenta muricata. Pedicelli medio articulati. Segmenta dorso laxe 3–5-nervata.

Folia subulata .... 77. *A. leptophyllum.*

Folia anguste linearia glabra.
78. *A. stenocarpum.* 79. *A. Torreyi.* 80. *A. flavescens.*

Folia anguste linearia ciliolata.
81. *A. Skinneri.* 82. *A. scabrellum.*

Subgenus BULBINELLA, *Kunth.*

Ovula in loculo gemina erecta. Pedicelli solitarii apice articulati. Racemi simplices sæpissime densi. Segmenta dorso carinata uninervata. *Herbæ capenses, foliis subulatis vel anguste linearibus facie canaliculatis, collo radicis setoso, floribus parvis.*

1. **A. TRIQUETRUM**, *Linn. Suppl.* 202; *Thunb. Prodr.* 62; *Flor. Cap.* 317.—Bulbine triquetra, *Schult. fil. Syst.* vii. 451.—Bulbinella triquetra, *Kunth, Enum.* iv. 573.—B. capillaris, *Kunth, Enum.* iv. 572.—Phalangium capillare, *Poir. Ency.* vii. 247.—Anthericum capillare, *Schult. fil. Syst.* vii. 457.—Bulbinella setifolia, *Kunth, Enum.* iv. 569.—Anthericum filiforme, *Ait. Hort. Kew.* i. 451.—Phalangium filiforme, *Poir. Ency.* v. 247.—Bulbinella filiformis, *Kunth, Enum.* iv. 572. Fibræ radicales inferne incrassatæ, collo radicis fibris setosis 12–18 lin. longis dense vestito. Folia 10–20 dense rosulata 4–6 poll. longa subulata glabra rigida 1-nervata ¼ lin. crassa. Scapus firmus gracilis 4–12-pollicaris. Racemus densissimus 1–2-pollicaris, expansus 8–12 lin. latus. Bracteæ lanceolatæ acuminatæ 1–1½ lin. longæ. Pedicelli ascendentes, inferiores 3–4 lin. longi. Perianthium albidum

1½ lin. longum, segmentis oblongis. Stamina perianthio paulo breviora. Capsula globosa, perianthio marcescente æquilonga. *Cap. B. Spei*, Thunberg! Masson! Oldenburg! Drege 1503! Zeyher 1690! 1691! Harvey 109! Wright 226! *Namaqualand*, Rev. H. Whitehead!

Var. TRINERVIS, *Baker*. Robustior, foliis pedalibus flexuosis trinervatis. *Cap. B. Spei*, Thunberg! Burchell 8043!

2. A. AITONI, *Baker*. Folia filiformia glabra viridia firmula 15–18 poll. longa basi ½ lin. crassa ad apicem angustata, venis circiter tribus immersis. Scapus flexuosus pedalis gracillimus glaber. Racemus laxissimus pauciflorus semipedalis. Bracteæ membranaceæ lineares 1½–3 lin. longæ. Pedicelli ascendentes, infimi 1½–2 poll. longi. Perianthium saturate luteum 3 lin. longum, segmentis oblongo-lanceolatis viridi vittatis. Stamina perianthio paulo breviora. *Cap. B. Spei*, Hort. Kew. anno 1778, in Herb. Mus. Brit!

3. A. PERONATUM, *Baker in Trimen's Journ.* i. 137.—Bulbinella peronata, *Kunth, Enum.* iv. 570. Folia dense rosulata subteretia 3–4 poll. longa ½ lin. crassa. Scapus subpedalis teres glaber. Racemus sesquipollicaris, densiflorus. Bracteæ minutæ deltoideæ cuspidatæ. Pedicelli 2 lin. longi. Perianthium luteum 1 lin. longum, segmentis oblongis 1-nerviis. Stamina perianthio paulo breviora. *Cap. B. Spei*, Drège 955.

4. A. ORNITHOGALOIDES, *Baker*.—Bulbinella? ornithogaloides, *Kunth, Enum.* iv. 693. Folia glabra semiteretia semipedalia facie canaliculata. Scapus teres glaber semipedalis. Racemus laxiflorus tripollicaris. Bracteæ deltoideæ cuspidatæ 1½–2 lin. longæ. Pedicelli floriferi 3–4 lin., fructiferi 5–6 lin. longi. Perianthium albidum 1 lin. longum, segmentis oblongis, exterioribus 5-, interioribus 3-nerviis. Stamina perianthio duplo breviora. *Cap. B. Spei*, Drège 8695.

5. A. CILIOLATUM, *Baker in Trimen's Journ.* i. 137.—Bulbine caudata, var. d, *Herb. Drège*.—Bulbinella ciliolata, *Kunth, Enum.* iv. 570. Fibræ radicales fasciculatæ, collo radicis copiose setoso. Folia dense fasciculata rigida triquetra 6–9 poll. longa ½–¾ lin. lata distincte 5–6-nervata. Scapus strictus teres 1–2-pedalis. Racemus dense 40–60-florus, expansus 2–3 poll. longus, 1 poll. latus. Bracteæ lanceolatæ acuminatæ 1½–2 lin. longæ. Pedicelli ascendentes, infimi 3–4 lin. longi. Perianthium flavidum 1½–2 lin. longum, segmentis oblongis. Stamina perianthio vix breviora. *Cap. B. Spei*, Masson! Drège!

6. A. NUTANS, *Thunb. Prodr.* 63; *Flor. Cap.* 319, *non Jacq.* Folia 6–10 anguste linearia viridia flaccida scapo breviora vel subæquilonga glabra facie canaliculata ¾–1 lin. lata obscure 7-nervata. Scapus 8–12-pollicaris. Racemus 20–25-florus, expansus 12–18 lin. longus, 8–9 lin. latus. Bracteæ lineares 2–2½ lin. longæ. Pedicelli ascendentes, infimi 3–4 lin. longi. Perianthium 2 lin. longum, saturate

luteum, segmentis oblongo-lanceolatis 1 lin. latis. Filamenta glabra 1½ lin. longa. Stylus filiformis, ovario globoso æquilongus. *Cap. B. Spei,* Thunberg !

7. A. GRACILE, *Baker in Trimen's Journ.* 1872, 137,—Bulbinella gracilis, *Kunth, Enum.* iv. 571. Fibræ radicales fasciculatæ. Folia 6–8 subpedalia flaccida viridia anguste linearia glabra facie canaliculata ½ lin. lata subtiliter 5–7-nervata. Scapus sesquipedalis vel pedalis. Racemi densi 12–18 lin. longi, expansi 9–12 lin. lati. Bracteæ perminutæ deltoideæ. Pedicelli ascendentes, inferiores 3–4 lin. longi. Perianthium 2 lin. longum saturate luteum, segmentis obtusis ½ lin. latis. Stamina perianthio paulo breviora. Stylus inclusus. *Cap. B. Spei,* Drège 2670 a! 2670 b!

8. A. CAUDA-FELIS, *Linn. Suppl.* 202; *Willd. Sp.* ii. 146; *Baker in Trimen's Journ.* 1872, 137.—Bulbine Cauda-felis, *Schult. fil. Syst.* vii. 450.—Anthericum caudatum, *Thunb. Prodr.* 63; *Flor. Cap.* 321.—Bulbinella? caudata, *Kunth, Enum.* iv. 572. Fibræ radicales fasciculatæ, collo radicis setoso. Folia 6–8 anguste linearia dura pedalia vel sesquipedalia facie canaliculata supra basin 1½–3 lin. lata crebre 10–12-nervata. Scapus teres 1–2 pedalis. Racemus densissimus oblongo-cylindricus, expansus 2–4 poll. longus, 9–12 lin. latus. Bracteæ lanceolatæ pallidæ 3 lin. longæ. Pedicelli ascendentes, inferiores 3–4 lin. longi. Perianthium sulphureum 2 lin. longum, segmentis oblongis 1 lin. latis. Stamina perianthio paulo breviora. Capsula oblonga sessilis perianthio marcescenti æquilongus. *Cap. B. Spei,* Thunberg! Masson! Drège! Burchell 3021! Ecklon et Zeyher 139!

9. A. SETOSUM, *Willd. Herb.* No 6656; *Schult. fil. Syst.* vii. 473; *Baker in Trimen's Journ.* 1872, 137.—Bulbinella robusta, *Kunth, Enum.* iv. 571. Fibræ radicales densæ graciles duræ, collo radicis fibris densis erectis 1–2 poll. longis tecto. Folia 6–10 dense rosulata firma persistentia anguste linearia 12–15 poll. longa supra basin 2–3 lin. lata facie canaliculata crebre 10–12-nervata ad apicem attenuata. Scapus 1½–2-pedalis, basi 3 lin. crassus. Racemus densus, primum conicus, expansus 3–4 poll. raro 6–8 poll. longus, 12–15 lin. latus. Bracteæ lanceolatæ 3–4 lin. longæ. Pedicelli diu ascendentes, inferiores 9–12 lin. longi. Perianthium saturate flavum, segmentis oblongis 1 lin. latis. Filamenta 1 lin. longa, basi applanata. Capsula obovoidea substipitata 1½ lin. longa, seminibus nigris erectis. *Cap. B. Spei,* Zeyher 4211! Ecklon et Zeyher, Asphod. 132! Drège 486! 8763! Harvey 108! Burchell 3021!

Subgenus CHRYSOBACTRON, *Hook. fil.*

Ovula in loculo gemina erecta. Pedicelli solitarii apice articulati.

Racemi simplices sæpissime densissimi. Segmenta dorso uninervata. *Herbæ foliis carnosulis glabris multinervatis linearibus vel lanceolatis, collo radicis haud fibroso, floribus parvis sæpissime flavis.*

10. A. CARNOSUM, *Baker.* Acaulis, fibris radicalibus carnosis dense fasciculatis. Folia 6–8 rosulata linearia glabra pedalia, basi 5–6 lin. lata, ad apicem attenuata, facie canaliculata. Scapus nudus fragilis 15–18-pollicaris. Racemus laxus, expansus 6–8 poll. longus, 12–15 lin. latus. Bracteæ minutæ deltoideæ. Pedicelli solitarii ascendentes apice articulati. Perianthium albidum 3–3½ lin. longum, segmentis ligulatis fusco-carinatis. Filamenta glabra applanata perianthio duplo breviora. Ovarium globosum stylo brevi. *Natalia ad rupes inundatas inter flumina Umzuito et Ifafa,* Gerrard et McKen 1890!

11. A. HOOKERI, *Colenso in Hook. fil. Hand. New Zeal.* i. 286.—Chrysobactron Hookeri, *Colenso*; *Hk. fil. Flor. New Zeal.* i. 255; *Hook. Ic.* t. 817; *Bot. Mag.* t. 4602. Fibræ radicales carnosæ dense fasciculatæ, collo radicis haud setoso. Folia dense rosulata 12–18 poll. longa glabra glauco-viridia 3–6 lin. lata ad apicem attenuata facie canaliculata. Scapus 1–2-pedalis. Racemus densiflorus 3–15 poll. longus, expansus 12–18 lin. latus. Bracteæ lanceolatæ 3–6 lin. longæ. Pedicelli diu ascendentes, apice articulati, inferiores 12–15 lin. longi. Perianthium aurantiacum 2½ lin. longum, segmentis oblongis 1 lin. latis, flore expanso patulis. Filamenta glabra 1 lin. longa. Stylus filiformis 1 lin. longus. Capsula oblonga 3 lin. longa breviter stipitata, seminibus geminis triquetris erectis 2 lin. longis. *Nova Zealandia in paludosis.*

12. A. ROSSII, *Hook. fil. Hand. New Zeal.* 285.—Chrysobactron Rossii, *Hook. Fl. Ant.* i. 72, t. 44, 45. Fibræ radicales densissimæ cylindricæ carnosæ, collo radicis nullo modo setoso. Folia 6–12 dense rosulata ascendentia lanceolata vel oblongo-lanceolata 6–18 poll. longa supra basin 1–2 poll. lata carnosula glabra crebre multinervata. Scapus strictus teres ½–2-pedalis 3–4 lin. crassus. Racemus densissimus 4–9 poll. longus, 15–18 lin. latus. Bracteæ lanceolatæ ante anthesin comosæ, inferiores 6–9 lin. longæ. Pedicelli diu ascendentes, inferiores 6–9 lin. longi. Perianthium saturate luteum 2 lin. longum, segmentis ligulatis obtusis ½ lin. latis. Flores polygami. Filamenta masculorum perianthio duplo breviora. Capsula globosa sessilis 2½ lin. longa, seminibus in loculo erectis geminis. *Insulæ Campbell et Auckland.*

13. A. FLORIBUNDUM, *Ait. Kew.* i. 447; *Schult. fil. Syst.* vii. 465; *Baker in Trimen's Journ.* i. 137.—Trachyandra? floribunda, *Kunth. Enum.* iv. 583.—Bulbinella latifolia, *Kunth. Enum.* iv. 572. Fibræ

radicales dense fasciculatæ, collo radicis haud setoso. Folia 6–8 rosulata lanceolata carnosula falcata glabra 15–18 poll. longa, supra basin 15–18 lin. lata, ad apicem angustata. Scapus strictus 1½–2-pedalis. Racemus densus, expansus 5–6 poll. longus. Bracteæ lineares 1½ lin. longæ. Pedicelli ascendentes, apice articulati, inferiores 5–6 lin. longi. Perianthium saturate flavum 1½ lin. longum, segmentis oblongis obtusis flore expanso patulis. Stamina perianthio paulo breviora. Ovula in loculo gemina erecta. Stylus ovario longior. *Cap. B. Spei*, Drège 2667a!

Subgenus SCHŒNOLIRION, *Torrey*.

Ovula in loculo gemina erecta. Pedicelli solitarii apice articulati. Racemi laxi simplices vel furcati. Segmenta dorso 3–5-nervata, post anthesin haud torta. *Herbæ foliis graminoideis, cormo obliquo tuberoso præditæ.*

14. A. CROCEUM, *Schult. fil. Syst.* vii. 476.—Phalangium croceum, *Michx. Flor. Bor. Am.* i. 196.—Ornithogalum croceum, *Elliot, Sketch*, i. 397; *Kunth, Enum.* iv. 371.—Schœnolirion Michauxii, *Torrey, Bot. Mex. Bound.* 220; *Chapm. Flora*, 483.—Ornithogalum texanum, *Scheele, Linn.* xxiii. 146. Perennis, cormo tuberoso obliquo crassitie digiti præditus. Folia 6–9 linearia graminoidea 12–18 poll. longa 1½–2 lin. lata glabra firmula. Scapus gracilis teres fragilis 1–1½ pedalis simplex vel furcatus. Racemus laxe 8–25-florus, expansus 2–4 poll. longus, 9–12 lin. latus. Bracteæ minutæ lanceolatæ. Pedicelli ascendentes, apice articulati, infimi 3–9 lin. longi. Perianthium albidum 2 lin. longum, segmentis oblongis dorso distincte 3–5-nervatis. Filamenta perianthio subduplo breviora. Capsula sessilis obovoideo globosa, seminibus in loculo nigris nitidis geminis erectis. *Alabama, Georgia, Florida, Louisiana.*—S. ALBUM, *Torrey loc. cit.* ab *croceo* dicitur recedere pedicellis bracteis subulatis brevioribus, perianthii segmentis magis membranaceis, nervis dorsalibus crebrioribus.

Subgenus STREPTANTHERA, *Baker in Trimen's Journ.* 1872, 101.

Ovula in loculo gemina erecta. Racemi laxissimi simplices vel paniculati. Perianthii segmenta dorso trinervata sæpissime cærulea, post anthesin more *Cæsiæ* spiraliter contorta. Pedicelli 1–3ni apice articulati. *Herbæ capenses foliis duris glabris graminoideis planis anguste linearibus. Cæsiæ* species dubiæ capenses, *Kunth, Enum.* iv. 609, vix ab *Cæsiis* australiensibus potui distinguere.

15. A. SCILLIFLORUM, *Eckl. Herb. Cap. Univ. Itin.* no. 36 b.—Cæsia Eckloniana, *Schult. fil. Syst.* vii. 1691; *Kunth, Enum.* iv. 609. Fasciculi plures foliorum et scaporum cæspitosi. Folia radicalia plura subdisticha anguste linearia 7–10 poll. longa vix 1 lin. lata rigida glabra apice triquetra. Scapi simplices 1½–2½ poll. longi. Racemus laxissimus 6–8 poll. longus simplex, internodis inferioribus 2-2½ poll. longis. Bracteæ inferiores 3 lin., supremæ vix 1 lin. longæ. Pedicelli fructiferi 3–4 lin. longi solitarii vel gemini. Perianthium defloratum spiraliter contortum, segmentis obtusis nervis mediis cæruleis. Capsula subglobosa 2½ lin. crassa profunde obtuse triloba. *Cap. B. Spei, ad montem tabularem,* Ecklon.

16. A. ZEYHERI, *Baker in Trimen's Journ.* 1872, 140. Fibræ radicales graciles duræ, collo radicis dense setoso. Folia 6–12 filiformia dura persistentia glabra 8–12 poll. longa ¼ lin. crassa tenuissima omnium specierum generis. Scapi gracillimi 2–3 poll. longi. Racemi simplices laxissimi 3–4 poll. longi, internodiis inferioribus 12–21 lin. longis. Bracteæ lanceolatæ ½–1 lin. longæ. Pedicelli deflexi, inferiores 2–3ni, 3–4 lin. longi, apice articulati. Perianthium 2 lin. longum, segmentis lanceolatis ½ lin. latis. Capsulam non vidi. *C. B. Spei,* Zeyher 4234!

17. A. BREVIFOLIUM, *Thunb. Prodr.* 62; *Flor. Cap.* 319; *Baker in Trimen's Journ.* 1872, 139.—Bulbine brevifolia, *Schult. fil. Syst.* vii. 450.—Bulbinella brevifolia, *Kunth, Enum.* iv. 573. Folia 5–6 dura glaberrima erecta anguste linearia 2–3 poll. longa 1½–2 lin. lata. Scapus gracilis erectus ebracteatus semipedalis. Racemus simplex, laxus 30–40-florus, expansus 6–7 poll. longus, 1 poll. latus. Bracteæ perminutæ deltoideæ. Pedicelli patuli, inferiores 5–6 lin. longi. Perianthium albidum 2½–3 lin. longum. Capsula globosa 1 lin. longa. *C. B. Spei,* Thunberg!

18. A. BREVICAULE, *Baker.*—Fibræ radicales haud incrassatæ. Folia 10–12 anguste linearia dura glabra semipedalia 1½ lin. lata facie canaliculata crebre nervata. Scapus ebracteatus 2–4-pollicaris. Racemi sæpissime simplices laxissimi subsecundi, 6–8 poll. longi 30–40-flori. Bracteæ lanceolatæ, inferiores 2–3 lin. longæ. Pedicelli solitarii, inferiores cernui 6-8 lin. longi. Perianthium albidum 2–2½ lin. longum. Capsula globosa obtuse angulata 1½ lin. longa et crassa. *Cap. B. Spei,* Thunberg!

19. A. BURKEI, *Baker in Trimen's Journ.* 1872, 140. Collum radicis fibris setosis erectis 2–3 poll. longis dense tectum. Folia 6–8 erecta dura anguste graminoidea sesquipedalia glabra 1 lin. lata, dorso triquetra, facie subplana margine scabra. Scapus infra paniculam sesquipedalis nudus teres. Panicula sesquipedalis, ramis pluribus elongatis ascendentibus. Racemi laxissimi 6-12 poll. longi, expansi

15–18 lin. lati. Bracteæ deltoideæ perminutæ. Pedicelli erecto-patentes 6–9 lin. longi, omnes solitarii, apice articulati. Perianthium album 3 lin. longum, segmentis oblanceolatis distincte fusco carinatis. Stamina perianthio paulo breviora, antheris oblongis luteis. Capsula stipitata depresso-globosa 1 lin. longa, valvis turgidis lævibus 1 lin. latis. *Cap. B. Spei, ad ripas fluminis Aapyes,* Burke!

20. A. Dregeanum, *Baker in Trimen's Journ.* 1872, 139.—Cæsia Dregeana, *Kunth, Enum.* iv. 611. Fasciculi foliorum et scaporum cæspitosi. Fibræ radicales haud incrassatæ. Folia radicalia plura basin caulis amplectentia anguste linearia graminoidea glabra semipedalia vel pedalia 1½–3 lin. lata subtiliter multinervata. Caulis infra paniculam 3–6-pollicaris flexuosus, foliis 1–2 3–6 poll. longis bracteatus. Panicula laxa pedalis, ramis 1 vel pluribus ascendentibus instructa. Racemi laxissimi 3–9 poll. longi, internodiis inferioribus 1½–2 poll. longis. Bracteæ deltoideæ vel infimæ lanceolatæ. Pedicelli apice articulati, inferiores 2–3ni 3–4 lin. longi. Perianthium cæruleum 4 lin. longum, segmentis linearibus post anthesin spiraliter contortis. Stamina perianthio distincte breviora. Capsulam non vidi. *Cap. B. Spei,* Drège 8767! 8768!

21. A. contortum, *Linn. Suppl.* 202; *Thunb. Prodr.* 63; *Flor. Cap.* 319; *Schult. fil. Syst.* vii. 480, 1695.—Cæsia Thunbergii, *Schult. fil. Syst.* vii. 1692; *Kunth, Enum.* iv. 610. Fasciculi plures foliorum et scaporum cæspitosi. Fibræ radicales haud incrassatæ, collo radicis dense setoso. Folia radicalia 6–9 bipedalia et ultra, basin caulis longe amplectentia anguste linearia plana graminoidea glabra 2–3 lin. lata crebre distincte nervata. Caulis 2–3-pedalis copiose dichotome furcatus, nodis fasciculis foliorum 3–12 poll. longorum præditis. Racemi laxissimi 3–12 poll. longi subsecundi, internodiis inferioribus 1–2 poll. longis. Bracteæ lanceolatæ 1–3 lin. longæ. Pedicelli patuli apice articulati, inferiores 2–3ni, 6–9 lin. longi. Perianthium purpurascens 2–3 lin. longum, segmentis linearibus post anthesin spiraliter contortis. Capsula globosa membranacea sessilis 2 lin. crassa. *Cap. B. Spei,* Thunberg! Masson! Burchell 726! 5748! 5951! Drège 1504 a! b! (non 8768 ut dicit Kunth), Harvey 881! etc.

Subgenus Holopodium, *Baker*.

Ovula in loculo plura superposita. Flores pauci albi in corymbum sessilem dispositi, pedicellis elongatis inarticulatis. Segmenta dorso laxe trinervata. *Herbæ humiles abyssinicæ, foliis anguste linearibus graminoideis, floribus albis magnitudine mediocribus.*

22. A. HUMILE, *Hochst. in Schimp. Pl. Abyss.* no. 1369; *A. Rich, Fl. Abyss.* ii. 331.—Phalangium humile, *Schwein. Beitr.* 294. Fibræ radicales paucæ cylindricæ carnosæ, collo radicis squamis magnis paucis albidis membranaceis tecto. Folia 6–8 arcuata anguste linearia glabra graminoidea 3–6 poll. longa 1½–2 lin. lata, margine minute ciliata. Flores 6–8 in corymbum sessilem vel subsessilem dispositi, pedicellis 6–18 lin. longis inarticulatis apice incrassatis. Perianthium album 5–6 lin. longum, segmentis lanceolatis 1–1½ lin. latis dorso laxe trinervatis. Filamenta perianthio duplo breviora, antheris 1 lin. longis. Stylus 2–3 lin. longus. Ovula in loculo plurima. *Abyssinia,* Schimper 320! 1369! Petit.

23. A. ANGUSTIFOLIUM, *Hochst. in Schimp. Pl. Abyss.* no. 1623; *A. Rich. Fl. Abyss.* ii. 331.—Phalangium angustifolium, *Schwein. Beitr.* 294. Fibræ radicales paucæ cylindricæ, carnosæ collo radicis tunicis paucis latis membranaceis cincto. Folia 4–5 anguste linearia glabra graminoidea arcuata 2–3 poll. longa ½–¾ lin. lata. Flores 2–3 in corymbum sessilem dispositi, pedicellis 6–18 lin. longis rectis inarticulatis apice incrassatis. Perianthium album 4 lin. longum, segmentis ligulatis 1 lin. latis dorso laxe trinervatis. Filamenta 2–3 lin. longa leviter applanata. Stylus filiformis 2–2½ lin. longa. Ovula in loculo plurima. Capsulam non vidi. *Abyssinia,* Schimper 1623! Quartin Dillon et Petit 187!

Subgenus PHALANGIUM, *Tourn.*

Ovula in loculo plura superposita. Perianthium album, segmentis dorso distincte 3–5-nervatis. Pedicelli 1–4ni, medio articulati. Filamenta glabra, haud papilloso-muricata. *Herbæ foliis anguste linearibus graminoideis glabris vel pubescentibus, floribus albis magnitudine mediocribus sæpissime laxe racemoso-paniculatis.*

24. A. RAMOSUM, *Linn. Sp.* 445; *Jacq. Austr.* t. 161; *Fl. Dan.* t. 1157; *Reich. Ic. Germ.* tab. 511. fig. 1114.—Phalangium ramosum, *Lam. Encyc.* v. 250; *Bot. Mag.* t. 1055; *Red. Lil.* t. 287.—Pessularia ramosa, *Salisb. Gen.* 70.—Ornithogalum ramosum, *Lam. Gall.* iii. 279. Perennis, rhizomate brevi obliquo, fibris radicalibus paucis carnosis. Folia 10–12 viridia persistentia glabra graminoidea 6–12 poll. longa 2–3 lin. lata ad apicem attenuata. Scapus 6–12-pollicaris gracilis teres. Racemi copiose paniculati laxi pauciflori 3–9 poll. longi. Bracteæ lineares 3–4 lin. longæ. Pedicelli ascendentes solitarii supra basin articulati, infimi 6–9 lin. longi. Perianthium album 5–6 lin. longum, segmentis dorso trinervatis, interioribus duplo latioribus. Filamenta alba filiformia, interiora 4 lin., exteriora 3 lin. longa. Ovula in loculo 6–8. Stylus filiformis 5–6 lin. longus.

Capsula globosa 3 lin. crassa, sessilis, obtuse lobata. *A Gottlandia, Gallia et Lusitania ad Dalmatiam, Illyriam et Tauriam.* A. Dorsetii, *Hort.*, est forma robusta grandiflora.

25. A. Liliago, *Linn. Sp.* 445; *Jacq. Hort. Vind.* t. 83; *Flor. Dan.* t. 616; *Bot. Mag.* t. 318; *Reich. Ic. Germ.* tab. 512, fig. 1115.—Phalangium Liliago, *Schreb. Spic.* 36; *Gawl. Bot. Mag.* t. 914, 1635.—Ornithogalum gramineum, *Lam. Gall.* iii. 278. Fibræ radicales plures cylindricæ 3–4 poll. longæ. Folia 12–20 omnia radicalia viridia anguste linearia graminoidea plana crebre nervata 6–12 poll. longa, 2–3 lin. lata. Scapus firmus teres 6–15-pollicaris. Racemi sæpissime simplices, interdum paniculati, laxi 10–20-flori, 2–6 poll. longi. Bracteæ lineares, inferiores 3–6 lin. longæ. Pedicelli ascendentes, infra medium articulati, solitarii, inferiores 6–9 lin. longi. Perianthium album 6–9 lin. longum, segmentis oblongis dorso distincte late trinervatis. Stamina perianthio duplo breviora. Ovula in loculo 6–9 superposita. Stylus 5–6 lin. longus. Capsula globosa 4–5 lin. crassa sessilis, seminibus in loculo 2–3. *A Dania et Lusitania ad Algeriam et Rossiam meridionalem.* Phalangium algeriense, *Boiss. et Reut. Pug.* 115, ab typo non potui segregare. P. bæticum, *Boiss. Elench.* 84, *Kunth, Enum.* iv. 595 (Anthericum bæticum, *Boiss. Voy.* 619, t. 172), est varietas angustifolia parviflora. A. intermedium, *Willk. Pl. Hisp. Exs.* ii. no 268, est forma angustifolia floribus majoribus.

26. A. drimiopsis, *Baker.* Fibræ radicales densæ haud incrassatæ, collo radicis densissime setoso. Folia 6–8 anguste linearia membranacea 12–15 poll. longa 5–6 lin. lata subtiliter nervata, marginibus crispatis minute ciliatis. Scapus simplex pedalis sursum pubescens, foliis 2–3 valde reductis bracteatus. Flores in spicam densam 2–3 poll. longam dispositi, expansam 5–6 lin. latam, axi sulcato dense pubescente. Bracteæ 3–6 lin. longæ supra basin dilatatam subulatæ membranaceæ brunneæ. Perianthium campanulatum 2½–3 lin. longum, segmentis obtusis dorso purpureo carinatis obscure trinervatis. Antheræ 1 lin. longæ, filamentis glabris filiformibus æquilongæ. Capsulam non vidi. *Africa tropicalis austro-orientalis inter Tette et Lupata,* Dr. Kirk!

27. A. nubicum, *Baker.* Collum radicis setis stramineis dense tectum. Folia linearia membranacea glabra acuminata 5–6 lin. lata crebre multinervata. Scapi teretes straminei glabri, bracteis 3–4 erectis stramineis linearibus 3–15 lin. longis instructi. Racemi laxissimi 4–6 poll. longi simplices vel furcati, internodiis inferioribus 12–18 lin. longis. Bracteæ minutæ albæ scariosæ deltoideæ. Pedicelli ascendentes, medio articulati, inferiores 2–3ni 3–4 lin. longi. Perianthium album 6 lin. longum, segmentis lanceolatis 1½ lin. latis dorso distincte

trinervatis. Stamina perianthio duplo breviora, filamentis filiformibus glabris, antheris defloratis convolutis. Capsulam non vidi. *Nubia ad ripas Nili Albi ad Nyangara,* Petherick!

28. A. PUBIRACHIS, *Baker.* Cæspites foliorum et scaporum aggregati, fibris radicalibus copiosis duris flexuosis interdum nodulosis. Folia 5–6 glabra anguste linearia falcata graminoidea 6–9 poll. longa 4–6 lin. lata crebre distincte multinervata, margine sub lente ciliata. Scapus simplex 3–4-pollicaris ebracteatus dense griseo-pubescens. Racemus simplex 1½–3 poll. longus, expansus 9–10 lin. latus sublaxus. Bracteæ lineari-subulatæ, inferiores 3–4 lin. longæ. Pedicelli ascendentes solitarii medio articulati 1–2 lin. longi. Perianthium albidum 4½–5 lin. longum, segmentis dorso distincte trinervatis. Filamenta glabra 1½ lin. longa, antheris luteis æquilonga. Stylus 3–4 lin. longus. Capsula globosa. *Guinea borealis ad Nupe.* Barter!

29. A. ZANGUEBARICUM, *Baker.* Folia 6–7 anguste linearia glabra graminoidea plana 8–12 poll. longa, 1–1½ lin. lata, crebre multinervata. Scapus gracilis simplex glaber subpedalis ebracteatus. Racemus laxus 2 poll. longus, internodiis inferioribus 3–4 lin. longis. Bracteæ minutæ brunneæ deltoideæ, infimæ lanceolatæ. Pedicelli inferiores gemini 3–4 lin. longi. Perianthium album 5–6 lin. longum, segmentis lanceolatis dorso crebre 3–4-nervatis. Stamina perianthio distincte breviora, antheris luteis 2 lin. longis, filamentis glabris brevioribus. Stylus 3–4 lin. longus. Ovula in loculo plura. *Zanguebaria ad Mombasa,* Dr. Kirk!

30. A. GRAMINEUM, *Baker.* Fibræ radicales densissimæ nodulosæ 5–6 poll. longæ, collo radicis setoso. Folia 5–6 glabra anguste linearia graminoidea plana pedalia 2–3 lin. lata ad apicem angustata crebre 15–20-nervata. Scapus strictus teres gracilis 1–2-pedalis. Racemi simplices vel parce paniculati, 2–4 poll. longi, internodiis inferioribus 5–6 lin. longis. Bracteæ perminutæ deltoideo-cuspidatæ. Pedicelli brevissimi medio articulati, inferiores 3–4ni. Perianthium 2 lin. longum, segmentis lanceolatis dorso trinervatis. *Madagascaria in ditione Ambongo,* Pervillé 579! 580!

31. A. SUBPETIOLATUM, *Baker.* Rhizoma obliquum fibris radicalibus haud incrassatis, collo radicis haud setoso. Folia 6-8 basin scapi amplectentia linearia pedalia membranacea medio 5–6 lin. lata glabra crebre nervata deorsum in petiolum canaliculatum angustata. Scapi glabri graciles 5–6 poll. longi. Racemus simplex laxus 2–3 poll. longus. Bracteæ superiores deltoideæ, inferiores lanceolatæ 3–4 lin. longæ. Pedicelli ascendentes, medio articulati, inferiores 2–3 lin. longi. Perianthium album 4 lin. longum, segmentis dorso laxe trinervatis. Stamina perianthio distincte breviora, antheris luteis 1 lin.

longis, filamentis glabris. Capsula globosa $2\frac{1}{2}$ lin. longa, valvis dorso lævibus carinatis, seminibus in loculo 5–6 turgidis. *Africa tropicalis orientalis ad Moramballa,* Kirk!

32. A. CAULESCENS, *Baker.* Fibræ radicales cylindricæ carnosæ edules, collo radicis haud setoso. Folia radicalia linearia pedalia membranacea 9–12 lin. lata glabra crebre nervata. Caulis infra paniculam bipedalis gracilis teres glaber, foliis pluribus inferioribus pedalibus, supremis 3–4 poll. longis bracteatus. Panicula laxissima pedalis, ramis ascendentibus gracillimis. Racemi 2–6 poll. longi, internodiis inferioribus 9–12 lin. longis. Bracteæ minutæ deltoideæ cuspidatæ. Pedicelli ascendentes, medio articulati, inferiores 3–4ni 6–9 lin. longi. Perianthium 5–6 lin. longum, segmentis $\frac{1}{2}$ lin. latis dorso late viridi vittatis trinervatis. Stamina perianthio duplo breviora, antheris minutis, filamentis glabris. Capsula globosa 2 lin. longa profunde lobata, seminibus in loculo sæpe 2. *Guinea borealis in rupestribus aridis ad Nupe,* Barter 1515!

33. A. GRANTII, *Baker, Linn. Trans.* xxix. 160, t. 103 B. Fibræ radicales densissimæ graciles, collo radicis densissime setoso. Folia 5–6 anguste linearia dura persistentia basin scapi amplectentia 6–12 poll. longa 3–5 lin. lata plana utrinque persistenter pubescentia, venis crebris distinctis circiter 30. Scapus anceps pedalis pubescens. Racemus floriferus laxus tripollicaris, rachi flexuosa pubescente, internodiis inferioribus 6–9 lin. longis. Bracteæ perminutæ deltoideæ. Pedicelli gemini patuli 1–2 lin. longi. Perianthium albidum 6–7 lin. longum, segmentis lanceolatis $1\frac{1}{2}$–2 lin. latis dorso crebre 3–5-nervatis. Stamina 4–$4\frac{1}{2}$ lin. longa, filamentis applanatis antheris æquilongis. Ovula in loculo plura. Stylus declinatus 4–5 lin. longus parce papillosus. *Africa æquinoctialis,* lat. 6° S., long. $33\frac{1}{2}$° E., Capt. Grant!

34. A. SPHACELATUM, *Baker.* Folia anguste linearia plana dense pubescentia crebre nervata; radicalia non vidi. Scapus bipedalis dense pubescens, foliis 1–2 reductis bracteatus. Racemus subdensus 2–3-pollicaris, ramis 1–2 brevibus ascendentibus distantibus. Bracteæ lanceolatæ puberulæ, infimæ 6–9 lin. longæ. Pedicelli ascendentes prope basin articulati, inferiores 2–3ni 2–3 lin. longi. Perianthium album $4\frac{1}{2}$–5 lin. longum, segmentis apice purpureis dorso distincte 5–6-nervatis. Stamina perianthio paulo breviora, antheris luteis 2 lin. longis, filamentis filiformibus æquilongis. Capsula globosa sessilis 4 lin. crassa, valvis horizontaliter rugosis. *Angola in ditione Ambriz,* Monteiro!

35. A. RIGIDUM, *Baker in Trimen's Journ.* 1872, 141.—Chlorophytum rigidum, *Kunth, Enum.* iv. 604. Folia plura pedalia rigide coriacea anguste linearia 2 lin. lata complicata glabra acuminata, venis creberrimis perspicuis exculptis. Scapus $1\frac{1}{2}$–2-pedalis teres glaber, foliis

2–3-linearibus parvis scariosis bracteatus. Racemi 4–5 paniculati, centralis 2–3 poll. longus inferne laxus. Bracteæ perminutæ purpureæ deltoideæ. Pedicelli ascendentes brevissimi medio articulati, inferiores gemini. Perianthium 4 lin. longum album, segmentis dorso brunneo carinatis crebre trinervatis. Stamina perianthio paulo breviora, filamentis glabris. *Cap. B. Spei*, Drège 8738 !

36. A. UNDULATUM, *Jacq. Coll. Suppl.* 87, *Ic.* ii. 18, t. 411 ; *Baker in Trimen's Journ.* 1872, 138.—Phalangium undulatum, *Poir. Ency.* v. 242.—A. graminifolium, *Willd. Sp.* ii. 139; *Schult. fil. Syst.* vii. 463.—Chlorophytum? graminifolium, *Kunth, Enum.* iv. 606. Fibræ radicales vix carnosæ, collo radicis haud setoso. Folia plura anguste linearia graminoidea glabra subpedalia acuminata 2–3 lin. lata. Scapus gracilis teres sesquipedalis, folio unico parvo bracteatus. Racemus simplex vel furcatus, centralis laxissimus semipedalis. Bracteæ lanceolatæ 3–6 lin. longæ. Pedicelli solitarii medio articulati, inferiores patuli 6–8 lin. longi. Perianthium album inodorum 6 lin. longum, segmentis obtusis haud carinatis, dorso laxe trinervatis. Stamina perianthio duplo breviora, antheris luteis filamentis filiformibus glabris 2–3plo brevioribus. Stylus 4–5 lin. longus. Ovarium globosum. *Cap. B. Spei.*

37. A. PACHYPHYLLUM, *Baker.* Cæspites foliorum et scaporum congesti, fibris radicalibus duris filiformibus, collo radicis dense setoso. Folia 6–8 basin caulis amplectentia linearia rigide coriacea dura 4–8 poll. longa 5–6 lin. lata acute carinata glabra, venis circiter 30 distincte exsculptis. Scapus 1–1½-pedalis glaber nervatus ebracteatus. Racemus simplex laxus 4–6 poll. longus, internodiis inferioribus 6–8 lin. longis. Bracteæ plurimæ imbricatæ parvæ membranaceæ deltoideæ, infimæ exteriores lanceolatæ 3–4 lin. longæ. Pedicelli ascendentes brevissimi prope basin articulati, inferiores 3–4ni, vetustate 3–4 lin. longi. Perianthium album 5–6 lin. longum, segmentis dorso viridi carinatis crebre trinervatis. Stamina perianthio ⅓ breviora, filamentis glabris antheris duplo longioribus. Capsula globosa sessilis 3 lin. longa, valvis jugis crebris horizontalibus rugosis, seminibus in loculo paucis triquetris. *Cap. B. Spei ad Grahamstown*, Herb. Kew. !

38. A. COOPERI, *Baker.* Fibræ radicales duræ graciles, collo radicis parce setoso. Folia 5–6 anguste linearia graminoidea glabra plana 6–9 poll. longa 2–3 lin. lata rigidula crebre nervata. Scapus gracilis teres striatus glaber ebracteatus. Racemus simplex subdensus 1–1½-pollicaris. Bracteæ imbricatæ, exteriores magnæ membranaceæ lanceolatæ, infimæ 6–9 lin. longæ, interiores parvæ deltoideæ. Pedicelli ascendentes medio articulati, inferiores 3–4ni, vetustate 3–4 lin. longi. Perianthium album 5–6 lin. longum, segmentis dorso distincte purpureo carinatis crebre trinervatis. Stamina perianthio ⅓ breviora,

antheris luteis 5 lin. longis, filamentis brevibus haud papillosis. Capsula oblonga 4 lin. longa glabra, valvis jugis crebris exsculptis rugosis. *Natalia,* Cooper 1004! *Basutu land,* Cooper 3302!

39. A. LONGISTYLUM, *Baker.* Folia plurima dura persistentia glabra 9–12 poll. longa 1½ lin. lata acuminata facie canaliculata crebre distincte nervata. Scapus ½–1-pedalis teres glaber ebracteatus. Racemi copiose paniculati, centrales 6–9 poll. longi, internodiis inferioribus 6–10 lin. longis. Bracteæ imbricatæ parvæ membranaceæ deltoideæ. Pedicelli ascendentes prope basin articulati, inferiores 2–3ni vetustate 3–4 lin. longi. Perianthium 6 lin. longum album, segmentis lanceolatis viridi carinatis crebre 3–5-nervatis. Antheræ luteæ 2 lin. longæ, filamentis glabris æquilongæ. Stylus declinatus exsertus 5–6 lin. longus. Capsula oblonga sessilis 4 lin. longa, valvis venis pluribus exsculptis rugosis. *Cap. B. Spei, in ditione Transvaal,* Baines! Natal, *Cooper* 3295!

40. A. ANCEPS, *Baker.* Folia 5–6 anguste linearia dura glabra graminoidea crebre distincte nervata 6–9 poll. longa 2–3 lin. lata. Scapus semipedalis glaber firmus anceps. Racemus centralis tripollicaris, ramo unico parvo instructus. Bracteæ membranaceæ deorsum latæ ovatæ sursum subulatæ 4–6 lin. longæ. Pedicelli brevissimi ascendentes, inferiores 2–3ni. Perianthium 4½ lin. longum album, segmentis ligulatis obtusis apice cite purpureis, dorso viridulo carinatis crebre 5–6-nervatis. Antheræ luteæ 1½ lin. longæ, filamentis brevissimis glabris. Stylus declinatus 3 lin. longus. *Cap. B. Spei, in ditione Transvaal,* Baines!

41. A. ANGULICAULE, *Baker.* Folia 6–8 dura anguste linearia graminoidea glabra 8–12 poll. longa 3 lin. lata acuminata, venis crebris exsculptis. Scapus glaber pedalis acute 2-angulatus ebracteatus. Racemi 1–3, centralis 4–5-pollicaris, internodiis inferioribus 5–6 lin. longis. Bracteæ purpurascentes parvæ deltoideæ infimæ lanceolatæ. Pedicelli ascendentes prope basin articulati, inferiores 2–3ni, demum 3–4 lin. longi. Perianthium album 4–4½ lin. longum, segmentis dorso viridulis crebre trinervatis. Stamina perianthio distincte breviora, antheris luteis 2 lin. longis, filamentis glabris brevissimis. Stylus declinatus 4 lin. longus. *Kaffraria britannica,* Mrs. Hutton! *Natalia,* Sanderson 261! *Transvaal,* Dr. Atherstone!

42. A. NANUM, *Baker.* Fibræ radicales cylindricæ, collo radicis setoso. Folia 6–12 anguste linearia glabra graminoidea 1–4 poll. longa 1½–3 lin. lata acuminata crebre nervata. Scapi simplices ebracteati 1–4 poll. longi glabri vel pubescentes. Racemus simplex laxus 1–2 poll. longus. Bracteæ minutæ deltoideæ. Pedicelli ascendentes medio articulati, infimi 1–1½ lin. longi. Perianthium 3–4 lin. longum album, segmentis dorso carinatis crebre 2–3-nervatis. Filamenta glabra

1½ lin. longa medio applanata. Capsula oblonga parva sessilis glabra, seminibus in loculo 8–10. *Mexico*, Graham 367! F. Müller 1329! Coulter 1564!

Var. RUDE, *Baker*. Folia pilis hispidis patulis albidis ubique vestita. *Mexico*, Jurgensen 698!

43. A. BRASILIENSE, *Baker*. Fibræ radicales paucæ carnosæ cylindricæ, collo radicis nullo modo setoso. Folia 6–8 anguste linearia glabra graminoidea 4–12 poll. longa 1½–4 lin. lata crebre nervata plana. Scapus glaber nudus 4–12-pollicaris. Racemi 2–6 laxissimi 3–6 poll. longi, internodiis infimis 1–1½ poll. longis. Bracteæ minutæ deltoideæ vel infimæ lanceolatæ. Pedicelli ascendentes, infra medium articulati, inferiores 2–3ni demum 3–4 lin. longi. Perianthium album 2–2½ lin. longum, segmentis oblongis dorso distincte trinervatis. Stamina perianthio distincte breviora, filamentis filiformibus glabris 1–1½ lin. longis. Capsula globosa 1½ lin. longa lævis, seminibus in loculo 2–3 triquetris. *Brasilia in ditione Goyaz*, Gardner 3471! Burchell 8149! 8169! *Piauhy*, Gardner 2319!

44. A. GLAUCUM, *Ruiz et Pav. Fl. Peruv.* iii. 68; *Schult. fil. Syst.* vii. 469; *Lodd. Bot. Cab.* t. 1580; *Bot. Mag.* t. 3610.—Phalangium glaucum, *Poir. Encyc. Suppl.* iv. 380; *Kunth, Enum.* iv. 579.—A. latifolium, *Schult. fil. Syst.* vii. 477.—Phalangium latifolium, *H. B. K. Nov. Gen.* i. 276. Fibræ carnosæ incrassatæ, collo radicis dense setoso. Folia 6–9 anguste linearia pedalia glabra 4–6 lin. lata plana graminoidea, venis immersis distinctis 20–30. Scapus glaber teres pedalis vel sesquipedalis ebracteatus. Racemi 1-4 laxi; centralis 5–6-pollicaris. Bracteæ imbricatæ deltoideæ cuspidatæ 1½–3 lin. longæ. Pedicelli ascendentes, medio articulati, inferiores 3–4ni 3–6 lin. longi. Perianthium album 5–6 lin. longum, segmentis dorso obscure laxe trinervatis. Filamenta glabra perianthio duplo breviora. Ovula in loculo 10–12. Capsulam non vidi. *Andes Boliviæ et Peruviæ*, Spruce 6079! etc.

45. A. ECCREMORHIZUM, *Ruiz et Pav. Fl. Peruv.* iii. 67, t. 301. fig. 6; *Schult. fil. Syst.* vii. 469.—Phalangium eccremorhizum, *Poir. Ency. Suppl.* iv. 380; *Kunth, Enum.* iv. 597. Fibræ radicales semipedales vix incrassatæ, collo radicis densissime setoso. Folia plura sesquipedalia membranacea glabra 6–12 lin. lata acuminata plana, venis 20–30 immersis perspicuis. Caulis 1–1½-pedalis teres glaber, foliis 3–4 reductis bracteatus. Racemi simplices vel furcati, centrales interdum pedales. Bracteæ magnæ lanceolatæ, superiores 2–3 lin., inferiores 15–18 lin. longæ. Pedicelli ascendentes medio articulati, inferiores 3–4ni 3–6 lin. longi. Perianthium album 9–12 lin. longum, segmentis oblanceolatis dorso laxe trinervatis. Filamenta glabra 4–4½ lin. longa, antheris linearibus 2½–3 lin. longis. Stylus

filiformis 5–6 lin. longus. Capsula oblonga ½-pollicaris lævis membranacea, seminibus in loculo 6–10. *Peruvia,* Pavon! Nation! Matthews 708! *Bolivia ad margines lacus Titicaca,* Pentland!

46. A. CILIATUM, *Schult. fil. Syst.* vii. 466.—Phalangium ciliatum, *H. B. K. Nov. Gen.* i. 276, t. 676; *Kunth, Enum.* iv. 595. Fibræ radicales fasciculatæ, collo radicis setoso. Folia radicalia plura linearia graminoidea 6–9 poll. longa vix 3 lin. lata falcata ciliolata. Caulis glaber teres subpedalis, folio unico parvo bracteatus. Racemus simplex laxus semipedalis, expansus 1½ poll. latus. Bracteæ lanceolatæ acuminatæ, inferiores 6–9 lin. longæ. Pedicelli ascendentes medio articulati, inferiores 2–3ni 3–6 lin. longi. Perianthium 8–9 lin. longum, segmentis oblongis medio crebre 3–5-nervatis. Stamina perianthio duplo breviora, antheris magnis filamentis glabris duplo longioribus. Ovarium oblongum, ovulis in loculo pluribus. *Caracas,* Humboldt.

47. A. VESTITUM, *Baker.* Fibræ radicales leviter incrassatæ, collo radicis setoso. Folia 9–10 anguste linearia plana graminoidea 4 poll. longa 1½ lin. lata pilis albidis deflexis patulis ubique vestita, venis 8–10 exsculptis distinctis. Scapus semipedalis gracilis teres pubescens ebracteatus. Racemus simplex vel furcatus laxus, centralis 1½–2 poll. longus. Bracteæ minutæ deltoideæ vel lanceolatæ. Pedicelli ascendentes pilosi infra medium articulati, inferiores 2–3ni 34 lin. longi. Perianthium album 5–6 lin. longum, segmentis dorso nervis tribus brunneis distinctis carinatis. Filamenta glabra 1½ lin. longa. Capsula lævis oblonga emarginata glabra, seminibus in loculo 12–15. *Mexico inter Vera Cruz et Orizaba,* F. Müller, 1331!

Subgenus TRACHYANDRA, *Kunth.*

Ovula in loculo pauca superposita. Filamenta muricata. Pedicelli solitarii apice articulati. Perianthium album, segmentis dorso purpureo vel viridi carinatis crebre obscure trinervatis. *Herbæ capenses, foliis glabris vel pubescentibus filiformibus vel planis, collo radicis sæpissime squamis magnis membranaceis cincto, floribus laxe racemoso-paniculatis.*

48. A FLEXIFOLIUM, *Linn. Suppl.* 201; *Thunb. Prodr.* 62; *Flor. Cap.* 318; *Schult. fil. Syst.* vii. 461—Trachyandra flexifolia, *Kunth, Enum.* iv. 579. Fibræ radicales cylindricæ carnosæ, collo radicis squamis albis membranaceis cincto. Folia 6–12 insigniter spiraliter contorta dura filiformia 4–6 poll. longa ½ lin. crassa glabra vel pilis hispidis brevibus patulis scabra. Scapus gracilis erectus teres 2–5 poll. longus ebracteatus glaber vel pilosus. Panicula obverse deltoidea 2–3 poll. longa et lata, ramis ascendentibus laxifloris. Bracteæ minutæ deltoideæ. Pedicelli ascendentes solitarii apice articulati, inferiores 3–4 lin. longi.

Perianthium 4–5 lin. longum, segmentis oblanceolatis fusco carinatis. Filamenta papillosa 2½ lin. longa. Capsulam non vidi. *Cap. B. Spei,* Thunberg! Drège 2671 *a*! *b*!

49. A. PUDICUM, *Baker.* Rhizoma elongatum, fibris copiosis gracilibus instructum, collo radicis squamis membranaceis cinctum. Folia teretia glabra 3–4 poll. longa, ½–1 lin. crassa, facie canaliculata. Scapi 1–2 poll. longi graciles teretes pilis minutis paucis patulis instructi. Racemi simplices vel furcati laxissimi; centralis 3–4-pollicaris. Bracteæ minutæ deltoideæ. Pedicelli solitarii, floriferi ascendentes, fructiferi decurvati, inferiores 6–8 lin. longi. Perianthium 3–4 lin. longum, segmentis dorso viridi carinatis. Capsula globosa sessilis lævis 2 lin. longa. *Cap. B. Spei ad Uitenhage,* Zeyher 1070!

50. A. JACQUINIANUM, *Schult. fil. Syst.* vii. 462; *Baker in Trimen's Journ.* 1872, 138.—Trachyandra Jacquinii, *Kunth, Enum.* iv. 578.—Anthericum flexifolium, *Jacq. Coll. Suppl.* 93, *Ic.* ii. t. 412, *non Linn.*—A. filiforme, *Thunb. Prodr.* 62, *Flor. Cap.* 318, *non Ait.*—A. elongatum, *Willd. Sp.* ii. 136; *Schult. fil. Syst.* vii. 456.—Trachyandra elongata, *Kunth, Enum.* iv. 584.—Fibræ radicales graciles vel carnosæ, collo radicis squamis membranaceis magnis albis cincto. Folia 6–9 pedalia subteretia 1 lin. crassa, juniora pilis paucis patulis instructa, adulta glabrescentia. Scapus teres ebracteatus 6–12-pollicaris. Racemi plures paniculati 2–4 poll. longi laxissimi. Bracteæ minutæ deltoideæ. Pedicelli ascendentes apice articulati 1–3 lin. longi. Perianthium 3–4 lin. longum, segmentis distincte carinatis. Filamenta ciliata 1½–2 lin. longa. Capsula obovoidea lævis 2 lin. longa, seminibus in loculo 2. *Cap. B. Spei,* Thunberg! Burchell 1602! 2344! 887! Cooper 1301!

Var. AFFINIS, *Baker.*—Trachyandra affinis, *Kunth, Enum.* iv. 579.—Anthericum filiforme β, *Herb. Thunb.*! ab typo recedit racemis simplicibus, pedicellis elongatis inferioribus interdum 6–9 lin. longis. *Cap. B. Spei,* Thunberg! Cooper 3308! *Natal,* Gerrard 552!

51. A. LONGEPEDUNCULATUM, *Steud. in Roem. et Schult. Syst. Veg.* vii. 457, 1692; *Baker in Trimen's Journ.* 1872, 138.—Trachyandra longepedunculata, *Kunth, Enum.* iv. 584.—A filiforme α, *Herb. Thunb.*!—A. vermicularis, *Soland. in Herb. Banks.* Fibræ radicales cylindricæ carnosæ, collo radicis squamis membranaceis cincto. Folia 4–6 subteretia glabra flexuosa 4–9 poll. longa ½–1 lin. crassa facie canaliculata. Scapi teretes glabri 1–3 poll. longi. Racemus simplex vel furcatus laxe 12–20-florus, centralis 1–2 poll. longus, expansus 18–21 lin. latus. Bracteæ ovato-cuspidatæ membranaceæ 3–4 lin. longæ. Pedicelli ascendentes apice articulati, inferiores 9–12 lin. longi. Perianthium 4½–5 lin. longum, segmentis dorso distincte brunneo carinatis crebre trinervatis. Filamenta muricata 2½–3 lin. longa. Cap-

sula obovoidea sessilis glabra 3 lin. longa, seminibus in loculo 2–3. *Cap. B. Spei*, Thunberg! Oldenburg! Ludwig! Wright 229!

52. A. Macowani, *Baker.* Fibræ radicales plurimæ fasciculatæ vix carnosæ, collo radicis densissime setoso. Folia plura subteretia 6–12 poll. longa ½ lin. crassa glabra, basi membranaceo-dilatata, recta vel flexuosa contorta. Scapus gracilis teres glaber 6–9-pollicaris ebracteatus. Racemus simplex laxiflorus 2–6-pollicaris. Bracteæ perminutæ deltoideæ. Pedicelli ascendentes solitarii apice articulati, inferiores 6–9 lin. longi. Perianthium 4–4½ lin. longum, segmentis oblanceolatis distincte carinatis. Stamina perianthio distincte breviora, filamentis papillosis. Capsulam non vidi. *Grahamstown*, M'Owan! *Graaf Reinet*, Bolus 740!

53. A. Saltii, *Baker.* Folia 6–8 arundinacea pedalia 1 lin. lata subplana ubique pilis mollibus patentibus vel deflexis ⅓ lin. longis vestita, venis 7–9 obscuris. Scapus semipedalis gracilis pubescens. Racemus simplex tripollicaris inferne laxus, rachi pilosa. Bracteæ lanceolatæ cuspidatæ 2–3 lin. longæ. Pedicelli solitarii apice articulati, inferiores 3–4 lin. longi. Perianthium album 3 lin. longum, segmentis distincte brunneo carinatis. Stamina perianthio vix breviora, filamentis dense muricatis. *Abyssinia*, Salt! (*Herb. Mus. Brit.*).

54. A. pubescens, *Baker.* Rhizoma obliquum 3–4 lin. crassum, fibris radicalibus densis vix carnosis, collo radicis dense setoso. Folia 6–10 anguste linearia semiteretia facie canaliculata 6–12 poll. longa 1 lin. lata, margine et dorso pilis mollibus patentibus hispidulis evanescentibus prædita. Scapi 3–6 poll. longi ebracteati, pilis hispidulis similibus præditi. Racemi laxissimi simplices vel parce paniculati; centralis 3–4 poll. longus, expansus 12–15 lin. latus. Bracteæ deltoideæ longe cuspidatæ. Pedicelli ascendentes solitarii apice articulati, infimi 4–5 lin. longi. Perianthium 5 lin. longum, segmentis dorso distincte brunneo carinatis. Stamina perianthio ⅓ breviora, antheris minutis, filamentis valde papillosis. *Cap. B. Spei in campis montosis, Somerset East,* MacOwan 1589! *Uitenhage,* Zeyher!

55. A. canaliculatum, *Ait. Hort. Kew.* i. 448; *Willd. Sp.* ii. 141; *Schult. fil. Syst.* vii. 460; *Bot. Reg.* t. 877; *Bot. Mag.* t. 1124.—Bulbine canaliculata, *Spreng. Syst.* ii. 86.—Phalangium canaliculatum, *Poir. Ency.* v. 249.—Trachyandra canaliculata, *Kunth, Enum.* iv. 578. Fibræ radicales cylindricæ carnosæ, collo radicis squamis magnis albis deltoideis membranaceis cincto. Folia 6–8 pedalia et ultra subteretia rigide coriacea ¾–1 lin. crassa facie canaliculata dorso distincte 5–6-nervata undique scabra. Scapus teres subpedalis ebracteatus ubique dense griseo-pubescens. Racemus simplex densus 20–40-florus, primum conicus, expansus 2–3 poll. longus, 18–21 lin. crassus. Bracteæ lanceolatæ 3–4 lin. longæ. Pedicelli dense pilosi ascendentes

solitarii 4–6 lin. longi. Perianthium albidum 6 lin. longum, segmentis oblanceolatis dorso dense pilosis brunneo carinatis. Filamenta perianthio duplo breviora hispida. Capsula globosa ½ poll. longa pilosa, seminibus in loculo 5–6. *Cap. B. Spei*, C. Wright 214! Harvey!

56. A. SCABRUM, *Linn. Suppl.* 202; *Thunb. Prodr.* 63, *Flor. Cap.* 320.—Bulbine scabra, *Schult. fil. Syst.* vii. 451.—Trachyandra scabra, *Kunth, Enum.* iv. 585. Folia plurima flexuosa debilia subteretia basi membranaceo-dilatata sesquipedalia 1–1½ lin. crassa facie canaliculata deorsum scabrula. Scapus compressus flexuosus ½–1-pedalis spinulis crystallinis scaber. Racemi furcati, ramis elongatis flexuosis persistenter scabris 6–12 poll. longis laxifloris expansis 18–21 lin. latis. Bracteæ minutæ lanceolatæ 1–2 lin. longæ. Pedicelli solitarii, apice articulati 6–19 lin. longi, floriferi ascendentes, fructiferi decurvati. Perianthium album 4–4½ lin. longum, segmentis oblanceolatis ¾ lin. latis distincte viridi carinatis. Filamenta 2½–3 lin. longa dense papillosa. Capsula depresso-globosa glabra 1½ lin. longa stipitata, seminibus in loculo 1–2. *Cap. B. Spei*, Thunberg!

57. A. ASPERATUM, *Baker in Trimen's Journ.* 1872, 138.—Trachyandra asperata, *Kunth, Enum.* iv. 574. Folia semiteretia basi membranaceo-dilatata 7–8 poll. longa rigida, setis minutissimis patulis scabra. Scapus 4-pollicaris teretiusculus scabratus. Racemus simplex 5-pollicaris laxus. Bracteæ deltoideæ 1 lin. longæ. Pedicelli solitarii 4 lin. longi, apice articulati. Perianthium 4–5 lin. longum, segmentis brunneo carinatis dorso crebre trinervatis. Stamina perianthio paulo breviora, filamentis muricatis. Ovula in loculo 4. *Cap. B. Spei*, Drège 8735.

58. A. HISPIDUM, *Linn. Sp.* 446; *Thunb. Prodr.* 63; *Flor. Cap.* 321; *Jacq. Coll. Suppl.* 91, *Ic.* ii. 17, t. 409.—Arthropodium hispidum, *Spreng. Syst.* ii. 87.—Trachyandra hispida, *Kunth, Enum.* iv. 575.—A. squameum, *Linn. Suppl.* 202; *Schult. fil. Syst.* vii. 481.—Phalangium squameum, *Poir. Ency.* v. 246.—Bulbinella squamea, *Kunth, Enum.* iv. 573.—A. undulatum, *Thunb. Prodr.* 63, *Flor. Cap.* 321, *non Jacq.*—Trachyandra undulata, *Kunth, Enum.* iv. 583. Fibræ radicales paucæ cylindricæ carnosæ, collo radicis squamis magnis membranaceis involucrato. Folia 4–6 plana ensiformia firma 4–6 poll. longa 2–6 lin. lata glabra humifusa, purpureo marginata interdum spiraliter contorta. Scapi teretes 1–6 poll. longi, pilis patulis albidis densis hispidi. Racemus simplex densissimus 30–40-florus, expansus 1½–2 poll. longus et latus. Bracteæ 6–9 lin. longæ ciliatæ lanceolato-acuminatæ. Pedicelli ascendentes hispidi, inferiores 9–10 lin. longi. Perianthium 4 lin. longum, segmentis oblanceolatis distincte carinatis extus prope basin dense pilosis. Stamina perianthio paulo breviora,

antheris minutis, filamentis dense papillosis. Capsula sessilis globosa lævis membranacea. *Cap. B. Spei,* Thunberg! Sieber! Zeyher 1693! &c. *Orange Free State,* Cooper 3296!

59. A. FALCATUM, *Linn. Suppl.* 202; *Thunb. Prodr.* 63, *Flor. Cap.* 323; *Willd. Sp.* ii. 138.—Bulbine falcata, *Schult. fil. Syst.* vii. 451.—Trachyandra falcata, *Kunth, Enum.* iv. 586.—A. vespertinum, *Jacq. Schœnb.* i. 44, t. 85; *Bot. Mag.* t. 1040.—Phalangium vespertinum, *Poir. Encyc.* v. 249.—Trachyandra vespertina, *Kunth, Enum.* iv. 581. Fibræ radicales carnosæ fasciculatæ, collo radicis squamis magnis membranaceis cincto. Folia 5–6 humifusa crassiuscula lorata 1½–2-pedalia 4–6 lin. lata, primum leviter pubescentia, cite glabrescentia, facie plana, dorso triquetra, venis immersis. Scapi 2–3 teretes glabri vel pilosuli 3–12-pollicares. Racemi 1–5 ascendentes sæpe pedales subdensi. Bracteæ lanceolatæ 3–4 lin. longæ. Pedicelli solitarii apice articulati ascendentes vel inferiores decurvati 6–9 lin. longi. Perianthium album 4–5 lin. longum, segmentis distincte brunneo-carinatis. Stamina perianthio paulo breviora, antheris parvis oblongis, filamentis elongatis muricatis. Capsula oblonga acuta 4½–5 lin. longa lævis, seminibus in loculo 5–6. *Cap. B. Spei,* Thunberg! Masson! Burchell 4076!

60. A. INVOLUCRATUM, *Baker.* Rhizoma obliquum lignosum crassitie calami, apice squamis imbricatis deltoideis albidis præditum. Folia plura anguste linearia plana glabra 3–4 poll. longa 2 lin. lata crassiuscula venis immersis. Scapi 1–2 poll. longi teretes glabri ebracteati. Racemus simplex laxissimus 3–4 poll. longus. Bracteæ deltoideocuspidatæ, inferiores 2–3 lin. longæ. Pedicelli solitarii, apice articulati ascendentes vel infimi deflexi 6–8 lin. longi. Perianthium 5–6 lin. longum, segmentis albidis anguste oblanceolatis dorso distincte brunneo-carinatis. Stamina perianthio duplo breviora, antheris minutis, filamentis muricatis. Capsulam non vidi. *Cap. B. Spei,* Drège 2681!

61. A. REVOLUTUM, *Linn. Sp. Plant.* 445 (*Commel. Hort.* i. t. 34); *Thunb. Prodr.* 62; *Bot. Mag.* t. 1044; *Schult. fil. Syst.* vii. 462.—Phalangium revolutum, *Pers. Synops.* i. 368.—Trachyandra revoluta, *Kunth, Enum.* iv. 579.—Anthericum divaricatum, *Jacq. Hort. Schœnb.* t. 414.—Trachyandra divaricata, *Kunth, Enum.* iv. 580. Fibræ radicales cylindricæ carnosæ, collo radicis squamis multis magnis brunneis membranaceis vestito. Folia plurima crassa dura glabra anguste linearia sesquipedalia 1½–2 lin. lata dorso convexa facie leviter canaliculata, venis immersis. Scapus teres glaber nudus ½–1-pedalis. Panicula, ramosissima 1–2 pedes lata, ramis multis strictis glabris erectopatentibus. Racemi laxissimi 3–6 poll. longi. Bracteæ minutæ deltoideæ. Pedicelli ascendentes solitarii apice articulati, inferiores 4–6

lin. longi. Perianthium album 4–4½ lin. longum, segmentis dorso distincte viridi carinatis crebre trinervatis. Stamina perianthio paulo breviora, antheris minutis, filamentis elongatis leviter papillosis. Capsula turbinata lævis membranacea 2–3 lin. longa, seminibus in loculo 3–4. *Cap. B. Spei,* Thunberg! Oldenburg! Nelson! Hort. Fothergill! Burchell 897! &c.

62. A. LONGIFOLIUM, *Jacq. Coll. Suppl.* 92, *Ic.* ii. 18, t. 413; *Schult. Syst.* vii. 464.—Phalangium longifolium, *Poir. Ency.* v. 243.—Trachyandra longifolia, *Kunth, Enum.* iv. 582.—A. fimbriatum, *Thunb. Prodr.* 63; *Flor. Cap.* 465; *Schult. fil. Syst.* vii. 465.—Trachyandra fimbriata, *Kunth, Enum.* iv. 583. Fibræ radicales fasciculatæ vix incrassatæ, collo radicis squamis membranaceis cincto. Folia plurima plana humifusa anguste lorata 1–2-pedalia 3–5 lin. lata ad faciem parce et ad margines dense setis albidis brevibus hispidis prædita, subtiliter multinervata. Scapus ½–1-pedalis ebracteatus nudus vel inferne setosus. Racemi plures ascendentes corymboso-paniculati laxi 2–6 poll. longi. Bracteæ minutæ deltoideo-cuspidatæ. Pedicelli solitarii ascendentes apice articulati, inferiores 4–6 lin. longi. Perianthium 4–4½ lin. longum, segmentis oblanceolatis distincte brunneo carinatis. Filamenta muricata, perianthio subduplo breviora, antheris oblongis. Capsulam non vidi. *Cap. B. Spei,* Thunberg! Gill! *Natalia,* Sanderson 987!

Var. BURCHELLII, *Baker.* Scapi elongati decumbentes pilosi, e nodis vivipari. Racemi laxissimi, interdum pedales, pedicellis longioribus, inferioribus fructiferis patulis vel decurvatis 9–12 lin. longis. Capsula globosa membranacea lævis 3 lin. longa, seminibus in loculo 2–3. *Cap. B. Spei,* Burchell 3795!

63. A. CILIATUM, *Linn. Suppl.* 202; *Jacq. Hort. Schœnb.* iv. 7, t. 413; *Thunb. Prodr.* 63, *Flor. Cap.* 324.—Bulbine ciliata, *Link, Enum.* i. 329; *Schult. fil. Syst.* vii. 450.—Trachyandra ciliata, *Kunth, Enum.* iv. 585.—A. blepharophorum, *Schult. fil. Syst.* vii. 461.—Trachyandra blepharophora, *Kunth, Enum.* iv. 578.—T. bracteosa, *Kunth, Enum.* iv. 582. Fibræ radicales cylindricæ carnosæ et graciles, collo radicis squamis magnis membranaceis cincto. Folia humifusa anguste lorata 1–2-pedalia 4–6 lin. lata arundinacea, venis immersis, margine pilis patulis albis evanescentibus ciliata. Scapus ½–1-pedalis teres ebracteatus deorsum pilosus. Racemi elongati subdensi simplices vel parce furcati, centralis sæpe pedalis. Bracteæ magnæ lanceolatæ brunneo carinatæ ante anthesin comosæ 5–6 lin. longæ. Pedicelli solitarii apice articulati, floriferi ascendentes, fructiferi decurvati, inferiores 6–9 lin. longi. Perianthium 4½–6 lin. longum, segmentis oblanceolatis distincte brunneo carinatis. Filamenta muricata, perianthio subduplo breviora. Capsula oblonga lævis 4–4½ lin. longa, se-

minibus in loculo 5–6. *Cap. B. Spei,* Thunberg! Drège 1493! Burchell 5601! C. Wright 213! 225! *Namaqualand,* Rev. H. Whitehead!

64. A. THYRSOIDEUM, *Baker in Trimen's Journ.* 1872, 139. Fibræ radicales carnosæ cylindricæ, collo radicis squamis membranaceis albidis cincto. Folia anguste linearia plana, 5–6 poll. longa, 1½–2 lin. lata, ubique pilis mollibus brevibus albidis patulis vestita. Scapus simplex ebracteatus pilosus 3–4 poll. longus. Panicula deltoidea thyrsoidea 2 poll. longa, ramis 2–4 brevibus ascendentibus. Racemus centralis 12–15 lin. longus, superne densus. Bracteæ latæ ovato-cuspidatæ 2–3 lin. longæ. Pedicelli ascendentes apice articulati 3–4 lin. longi. Perianthium 3–4 lin. longum, segmentis distincte brunneo carinatis. Stamina perianthio distincte breviora, antheris minutis, filamentis elongatis muricatis. *Cap. B. Spei,* Burchell 1231!

65. A. MURICATUM, *Linn. Suppl.* 202; *Thunb. Prodr.* 63, *Flor. Cap.* 322; *Schult. Syst.* vii. 459.—Arthropodium muricatum, *Spreng. Syst.* ii. 87.—Trachyandra muricata, *Kunth, Enum.* iv. 576. Folia plura lorata plana dura 1–1½-pedalia 5–6 lin. lata distincte 30–40-nervata, ubique setis brevibus scaberrima. Scapus robustus teres pedalis flexuosus scaber pubescens. Racemi 4–8 ascendentes laxi, centrales 6–8 poll. longi. Bracteæ minutæ deltoideo-cuspidatæ. Pedicelli solitarii ascendentes apice articulati, inferiores 5–6 lin. longi. Perianthium 4–5 lin. longum, segmentis oblanceolatis brunneo carinatis. Filamenta muricata perianthio subduplo breviora. *Cap. B. Spei,* Thunberg! Masson!

66. A. GERRARDI, *Baker in Trimen's Journ.* 1872, 137. Folia 8–9 dura crassa planiuscula 6–9 poll. longa 1½–2 lin. lata acuminata setis hispidis patulis minutis albidis scabra, nervis inconspicuis, marginibus incrassatis. Scapus 4–6-pollicaris teres ebracteatus spinulis densis patulis scaberrimus. Racemi plurimi paniculati laxiflori 3–6 poll. longi, expansi 2 poll. lati, rachibus persistenter scabris. Pedicelli solitarii apice articulati, floriferi ascendentes, fructiferi patuli 6–12 lin. longi. Perianthium 5–6 lin. longum albidum, segmentis brunneo carinatis crebre obscure trinervatis. Stamina perianthio distincte breviora, antheris minutis luteis, filamentis muricatis filiformibus 2–2½ lin. longis. Capsula globosa sessilis dense setosa, seminibus in loculo pluribus. *Zulu-land,* Gerrard et M'Kew 1527! *Craddock,* Mrs. Barber 235! *Grahamstown,* M'Owan 1454!

67. A. HIRSUTUM, *Thunb. Prodr.* 63, *Flor. Cap.* 322; *Schult. fil. Syst. Veg.* vii. 460.—Trachyandra hirsuta, *Kunth, Enum.* iv. 577.—T. corymbosa, *Kunth, Enum.* iv. 577. Fibræ radicales vix incrassatæ. Folia plura linearia plana 1–1½-pedalia 3–5 lin. lata ubique pilis patentibus nitidis albis vestita subtiliter multinervata. Scapus ½–1-pe-

dalis pilosus ebracteatus. Racemi 1–3 laxi elongati ascendentes, centrales 6–9 poll. longi, expansi 8–9 lin. lati. Bracteæ parvæ deltoideo-cuspidatæ. Pedicelli ascendentes solitarii apice articulati, infimi 5–6 lin. longi. Perianthium album 4½–5 lin. longum, segmentis oblanceolatis distincte brunneo carinatis. Filamenta muricata, perianthio subduplo breviora. Capsula globosa glabra 2 lin. longa, seminibus in loculo 2–3. *Cap. B. Spei,* Thunberg! Oldenburg! Drège 1494! 8716, Burchell 4118! (forma dense pilosa vivipara, caulibus elongatis decumbentibus, rosulis foliorum e nodis productis), 6654! 6797! C. Wright 215!

68. A. PARADOXUM, *Schult. fil. Syst.* vii. 459.—Trachyandra paradoxa, *Kunth, Enum.* iv. 576. Rhizoma obliquum crassitie pennæ anatinæ, fibris radicalibus haud carnosis, collo radicis squamis membranaceis cincto. Folia radicalia 2 erectiuscula 3½–4½ poll. longa basi attenuata pilis setosis albidis patentibus dense vestita, apice intumescentia truncata in laminas 2 fissa, ut urceolus quasi inde formatur 4 lin. diametri, margine superiore longiore revoluto membranaceo-aristato. Scapus hispidus bipollicaris. Racemus densus pollicaris pedicellis hispidis, defloratis reflexis, inferioribus vetustate 8–12 lin. longis. Bracteæ ovato-cuspidatæ magnæ. Perianthium 6 lin. longum, segmentis distincte carinatis. Stamina perianthio ⅓ breviora, filamentis muricatis, antheris minutis. *Cap. B. Spei,* Herb. Zuccarini.

Subgenus DILANTHES, *Baker in Trimen's Journ.* 1872, 101.

Ovula in loculo plura superposita. Filamenta cum stylo papilloso-muricata. Perianthium album segmentis purpureo vel viridi carinatis crebre 3–7-nervatis. Pedicelli medio articulati, inferiores 2–3ni. *Herbæ perennes Africanæ, foliis anguste linearibus graminoideis, floribus laxe racemoso-paniculatis, collo radicis dense setosis.*

69. A. NIDULANS, *Baker.* Cæspites segregati, fibris radicalibus haud incrassatis, collo radicis copiose setoso. Folia anguste linearia graminoidea dura glabra 9–15 poll. longa 2–4 lin. lata crebre nervata. Scapi 3–12-pollicares teretes glabri, foliis pluribus scariosis vaginantibus bracteati. Racemi simplices vel paniculati 1–2 poll. longi, internodiis omnibus brevibus. Bracteæ plures imbricatæ parvæ scariosæ deltoideæ. Pedicelli brevissimi 1–1½ lin. longi medio articulati, inferiores 3–4ni. Perianthium 4–4½ lin. longum, segmentis dorso distincte viridi carinatis, 3–4-nervatis. Capsulam non vidi. *Africa tropicalis austro-orientalis ad montem Chiradzura,* Dr. Meller!

70. A. CAMERONI, *Baker.* Radicem non vidi. Folia anguste linearia graminoidea interiora basin scapi longe amplectentia 12–15 poll. longa

3–4½ lin. lata acuminata distincte costata crebre multinervata plana glabra. Scapus pedalis strictus ebracteatus. Racemus laxus simplex 4–6-pollicaris rachi gracili insigniter flexuosa. Bracteæ minutæ deltoideæ. Pedicelli gemini ascendentes 1–3 lin. longi medio articulati. Perianthium albidum 7–8 lin. longum, segmentis lanceolatis brunneo carinatis crebre 5–7-nervatis. Stamina perianthio vix breviora, filamentis applanatis antheris linearibus æquilongis. Stylus declinatus, 6–7 lin. longus. Ovula in loculo plura superposita. *Africa tropicalis in ditione lacus Tanganyika,* Lieut. Cameron!

71. A. TRIFLORUM, *Ait. Hort. Kew.* i. 448; *Willd.Sp.* ii. 140; *Schult. fil. Syst.* vii. 466.—Chlorophytum? triflorum, *Kunth, Enum.* iv. 606.—Anthericum bipedunculatum, *Jacq. Coll. Suppl.* 88, *Ic.* ii. 18, t. 410.—Phalangium pedunculatum, *Poir. Ency.* v. 244.—P. triflorum, *Pers. Syn.* i. 369.—Anthericum pauciflorum, *Thunb. Prodr.* 63; *Flor. Cap.* 320.—Trachyandra pauciflora, *Kunth, Enum.* iv. 584. Fibræ radicales densæ nodulosæ, collo radicis dense setoso. Folia 6–9 anguste linearia graminoidea 6–9 poll. longa 3–4 lin. lata glabra crebre multinervata plana. Scapus 6–18-pollicaris glaber, bracteis 2–3 parvis instructus. Racemus simplex 3–4-pollicaris laxus, expansus 1–1¼ poll. latus. Bracteæ purpureo tinctæ superiores deltoideæ, inferiores lanceolatæ 3–4 lin. longæ. Pedicelli ascendentes, medio articulati, inferiores 2–3ni 4–6 lin. longi. Perianthium 6–7 lin. longum, segmentis oblanceolatis dorso rubro-brunneo carinatis crebre trinervatis. Filamenta filiformia papillosa 3–4 lin. longa, antheris parvis oblongis luteis. Stylus declinatus 3–4 lin. longus. Capsula globosa, valvis horizontaliter rugosis. *Cap. B. Spei,* Thunberg! Nelson! Ecklon et Zeyher 117! Drège 8722*a*! &c.

Var. MINOR, *Baker.* Folia convoluta 1 lin. lata. Racemi 1–1½ poll. longi, floribus 3–4 omnibus solitariis. *Cap. B. Spei,* Drège 8723*a*!

72. A. SCHULTESII, *Baker in Trimen's Journ.* 1872, 140.—Trachyandra? Schultesii, *Kunth, Enum.* iv. 586.—Chlorophytum dubium, *Schult. fil. Syst.* vii. 455. Fibræ radicales carnosæ. Folia radicalia 6–7 anguste linearia scapo breviora 2 lin. lata falcata complicato-canaliculata glabra, margine undulato tenuiter ciliata, basi purpurascentia. Scapus semipedalis glaber teres, foliis 1–2 reductis bracteatus. Racemus simplex 2–3-pollicaris. Bracteæ deltoideo-cuspidatæ 3–5 lin. longæ. Pedicelli ascendentes medio articulati 1–2ni 3–4 lin. longi. Perianthium 5 lin. longum album, segmentis oblongis carinatis 1½–2 lin. latis. Stamina perianthio paulo breviora, filamentis filiformibus muricatis. Stylus stamina superans. *Cap. B. Spei* (Herb. Zuccarini).

73. A. BREHMEANUM, *Baker in Trimen's Journ.* 1872, 139.—Chlorophytum Brehmeanum, *Schult. fil. Syst.* vii. 454.—Trachyandra? Brehmeana, *Kunth, Enum.* iv. 586.—Rhizoma subrepens durum, fibris carno-

sis longis deorsum incrassatis, collo radicis setoso. Folia plura anguste linearia 6–7 poll. longa 2–3 lin. lata, margine ciliata. Scapus strictus glaber pedalis, squamis 3 distantibus membranaceis instructus. Racemus laxus simplex 2–3-pollicaris. Bracteæ minutæ deltoideo-cuspidatæ. Pedicelli ascendentes solitarii medio articulati 3–4 lin. longi. Perianthium 3–4 lin. longum, segmentis obtusis viridi carinatis. Stamina perianthio ⅓ breviora, filamentis muricatis. *Cap. B. Spei,* Brehm.

74. A. FASCICULATUM, *Baker.* Folia plura teretia dura 2–3 poll. longa. Scapus 2–3-pollicaris ebracteatus. Racemus simplex 1–1½ poll. longus, bracteis parvis membranaceis et floribus pluribus fasciculatis. Pedicelli ascendentes 2–3 lin. longi. Perianthium 6 lin. longum album, segmentis linearibus dorso viridulo-carinatis crebre 5–6-nervatis. Antheræ 1 lin. longæ luteæ, filamentis muricatis triplo breviores. *Cap. B. Spei ad campos fluminis Vaal,* Mrs. Barber!

75. A. PULCHELLUM, *Baker in Trimen's Journ.* 1872, 140.—Chlorophytum? pulchellum, *Kunth, Enum.* iv. 605. Fibræ radicales haud incrassatæ, collo radicis parce setoso. Folia 5–6 anguste linearia graminoidea glabra 6–12 poll. longa 1¼–2 lin. lata venis crebris distinctis 10–12. Scapus anceps ebracteatus gracilis glaber 3–12-pollicaris. Racemi simplices vel paniculati laxi 2–3 poll. longi. Bracteæ minutæ deltoideo-cuspidatæ. Pedicelli ascendentes, inferiores 2–3ni 2–3 lin. longi medio articulati. Perianthium 3–4 lin. longum, segmentis albis dorso viridi carinatis crebre trinervatis. Stamina perianthio paulo breviora. Antheræ luteæ 1 lin. longæ, filamentis filiformibus papillosis duplo breviores. Stylus 3 lin. longus. Capsula globosa sessilis 3 lin. longa, valvis jugis pluribus horizontalibus rugosis. *Natalia,* Krauss 74! Plant 78! Gerrard 554! Sanderson 261. *Cap. B. Spei,* Cooper 783! 3300! *Ad sinum Delagoa,* Forbes!

76. A. VISCOSUM, *Baker in Trimen's Journ.* 1872, 141.—Chlorophytum? viscosum, *Kunth, Enum.* iv. 605. Fibræ radicales elongatæ graciles haud incrassatæ, collo radicis basibus foliorum haud setosis cincto. Folia 6–10 anguste linearia glabra graminoidea semipedalia dura 1½–2 lin. lata crebre nervata. Scapus 3–4-pollicaris anceps, dimidio superiore puberulus. Racemi paniculati 1–3 poll. longi laxi, rachibus dense pubescentibus. Bracteæ basi deltoideæ apice longe subulatæ, inferiores 6–8 lin. longæ, superiores deltoideæ. Pedicelli ascendentes gemini 1–2 lin. longi. Perianthium 4 lin. longum, segmentis albidis dorso viscidulis crebre 3–5-nervatis. Stamina perianthio duplo breviora, filamentis papillosis. Capsula globosa lævis 3 lin. longa, valvis jugis pluribus horizontalibus rugosis. *Cap. B. Spei,* Drège 2673!

Subgenus HESPERANTHES, *Baker*.

Ovula in loculo plura superposita. Filamenta muricata. Perianthium album, segmentis dorso more *Phalangii* laxe 3–5-nervatis. Pedicelli medio articulati, inferiores 2–3ni. *Herbæ Americanæ, foliis anguste linearibus graminoideis, floribus magnitudine mediocribus racemo-paniculatis.*

77. A. **LEPTOPHYLLUM**, *Baker*.—Echeandia leptophylla, *Benth. Pl. Hartweg.* 26; *Kunth, Enum.* iv. 629.—E. graminea, *Mart. et Gal. Enum. Mex.* 16; *Kunth, Enum.* iv. 699. Fibræ radicales paucæ carnosæ cylindricæ apice clavatæ, collo radicis dense fibroso. Folia 20–30 falcata subulata dura glabra 3–4 poll. longa supra basin linearem ⅓ lin. crassa. Scapus filiformis teres 3–4 pollicaris nudus vel folio unico reducto bracteatus. Racemus laxus 3–4-pollicaris simplex vel ramo unico parvo præditus. Bracteæ minutæ deltoideo-cuspidatæ. Pedicelli ascendentes prope basin articulati, inferiores 2–3ni, 3–4 lin. longi. Perianthium album 4–4½ lin. longum, segmentis dorso laxe trinervatis. Stamina perianthio distincte breviora, filamentis muricatis 2 lin. longis. Ovula in loculo 15–20. Stylus declinatus papillosus 3 lin. longus. *Mexico*, Hartweg 218! Galeotti 5378!

78. A. **STENOCARPUM**, *Baker*. Folia plurima pedalia anguste linearia graminoidea plana 3–4 lin. lata ad apicem attenuata, venis 12–15 crebris perspicuis. Scapus teres glaber profunde furcatus. Panicula sesquipedalis, ramis paucis distantibus strictis ascendentibus. Racemus laxus, centralis 5–6-pollicaris. Bracteæ imbricatæ, interiores deltoideæ, exteriores lanceolatæ 3–6 lin. longæ. Pedicelli ascendentes medio articulati, inferiores gemini 5–6 lin. longi. Perianthium album 7–8 lin. longum, segmentis dorso distincte trinervatis. Filamenta muricata 4–5 lin. longa. Stylus 3 lin. longus. Capsula oblongo-clavata membranacea lævis, seminibus in loculo 30–40. *Mexico*, Gregg 393!

79. A. **TORREYI**, *Baker*.—Echeandia terniflora, var.? angustifolia, *Torrey, Bot. Mex. Bound.* 219. Fibræ radicales cylindricæ carnosæ, collo radicis dense setoso. Folia plurima dura anguste linearia plana graminoidea crebre nervata 9–12 poll. longa, 1½–2 lin. lata. Scapus teres gracilis glaber 9–18-pollicaris, foliis 1–2 valde reductis bracteatus. Racemi laxissimi pauci paniculati, centralis 6–9 poll. longus, internodiis inferioribus 9–12 lin. longis. Bracteæ imbricatæ minutæ albæ deltoideæ. Pedicelli inferiores 3–4ni, infra medium articulati, ascendentes, demum 4–6 lin. longi. Perianthium album 6–7 lin. longum, segmentis dorso distincte 3–4-nervatis. Stamina perianthio ⅓ breviora, filamentis filiformibus muricatis, antheris 1½ lin. longis. Capsula oblonga, perianthio marcescente vix brevior. *Mexico Nova*,

C. Wright 690! 1912! Fendler 851! *Mexico prope Monterey*, Dr. Edwards.

80. A. FLAVESCENS, *Schult. fil. Syst.* vii. 1692.—Phalangium flavescens, *Kunth, Enum.* iv. 596. Folia plurima anguste linearia dura glabra facie canaliculata 5–6 poll. longa, 1–1½ lin. lata. Scapus teres semipedalis glaber, foliis 1–2 reductis bracteatus. Racemi 3, inferiores parvi remoti ascendentes, centralis semipedalis internodiis inferioribus 9–12 lin. longis. Bracteæ lanceolatæ, inferiores 3–4 lin. longæ. Pedicelli brevissimi, infra medium articulati, inferiores 2–3ni. Perianthium albidum 4 lin. longum, segmentis dorso distincte trinervatis. Filamenta muricata, perianthio duplo breviora. Ovula in loculo plurima. *Mexico*, Coulter 1562!

81. A. SKINNERI, *Baker*. Fibræ radicales cylindricæ, collo radicis parce setoso. Folia radicalia plura anguste linearia graminoidea acuminata ciliolata 6–8 poll. longa, 2–3 lin. lata plana crebre distincte nervata. Scapus teres glaber semipedalis, folio unico parvo bracteatus. Racemi simplices laxissimi 4–5 poll. longi, internodiis inferioribus 1–1½ poll. longis. Bracteæ superiores deltoideæ, inferiores lanceolatæ. Pedicelli ascendentes medio articulati, inferiores 2–3ni demum 6–8 lin. longi. Perianthium 8–9 lin. longum, segmentis dorso distincte 3–5-nervatis. Filamenta papillosa 2½–3 lin. longa, antheris ½ lin. longis. Capsula immatura oblonga. *Guatemala*, Skinner!

82. A. SCABRELLUM, *Baker*.—Phalangium scabrellum, *Benth. Pl. Hartweg.* 293. Fibræ radicales dense fasciculatæ medio carnosæ cylindricæ, collo radicis dense setoso. Folia radicalia 5–6 anguste linearia graminoidea 3–4 poll. longa falcata acuminata 1½–3 lin. lata facie glabra venis crebris exsculptis margine ciliolata. Scapus 6–8-pollicaris teres puberulus ebracteatus vel folio unico parvo bracteatus. Racemi 1–2 laxi; centralis 3–4 poll. longus, angustus. Bracteæ imbricatæ minutæ deltoideæ. Pedicelli ascendentes, medio articulati, inferiores 2–3ni demum 4–5 lin. longi. Perianthium 4½–5 lin. longum, segmentis obscure carinatis dorso laxe trinervatis. Filamenta muricata antheris triplo breviora. Capsulam non vidi. *Mexico ad Lagos*, Hartweg 1622!

15. DICHOPOGON, *Kunth.*

Kunth, Enum. iv. 622.—Arthropodii sp., *R. Br.*, *Hook. fil.* &c.

Perianthium corollinum 6-partitum purpureum, segmentis subconformibus oblongo-oblanceolatis dorso laxe 3–5-nervatis flore expanso patulis. *Stamina* 6 inclusa subhypogyna, filamentis brevibus applanatis, antheris magnis ligulatis obtusis basifixis, lobis inferne in caudas parvas papillosas productis. *Ovarium* sessile triloculare, ovulis in loculo pluribus; stylus filiformis; stigma capitatum. *Capsula* globosa membranacea loculicide trivalvis, seminibus in loculo 10–12 crebris biseriatis turgidis, testa membranacea nigra nitidula punctata, albumine copioso .*Herbæ perennes Australienses, habitu* Antherici, *foliis omnibus radicalibus anguste linearibus graminoideis, scapo ebracteato, floribus laxe racemoso-paniculatis, pedicellis medio articulatis.*

Pedicelli ascendentes sæpissime solitarii ...., 1. *D. humilis.*
Pedicelli deflexi, inferiores 2–3ni .... 2. *D. strictus.*

1. D. HUMILIS, *Kunth, Enum.* iv. 623.—Arthropodium laxum, *Hook. fil. Flor. Tasm.* ii. 51, tab. 131, *non Sieber.*—A. strictum, *F. Müll. Frag.* vii. 66, *non R. Br.*—D. leimonophilus, *F. Mull. in Herb. Kew.* Fibræ radicales copiosæ nodulosæ, collo radicis parce setoso. Folia radicalia 6–12 anguste linearia graminoidea glabra 6–9 poll. longa 1½–3 lin. lata ad apicem angustata. Scapus 6–12-pollicaris ebracteatus. Racemi laxi 6–12 poll. longi simplices vel furcati expansi 12–18 lin. lati. Bracteæ superiores deltoideæ, inferiores lanceolatæ 6–9 lin. longæ. Pedicelli solitarii rarissime gemini diu ascendentes infimi 6–18 lin. longi infra apicem articulati. Perianthium 6–9 lin. longum, segmentis purpureis teneris late carinatis. Stamina perianthio duplo breviora, antheris erectis 2 lin. longis. Capsula membranacea globosa 2–2½ lin. longa, seminibus in loculo 5–6. *Tasmania et Australia temperata orientalis.*

2. D. STRICTUS, *Baker.*—Arthropodium strictum, *R. Br. Prod.* 276.—Dichopogon Sieberianus, *Kunth, Enum.* iv. 623.—Arthropodium laxum, *Sieber, Exsic.* No. 194, *non Hook. fil.*—Dichopogon setosus, *Kunth, Enum.* iv. 623, *excl. syn.* Fibræ radicales densæ, collo radicis dense setoso. Folia *D. humilis* sed angustiora. Scapus gracilis flexuosus ebracteatus 6–12-pollicaris. Racemi laxissimi semipedales simplices vel furcati. Bracteæ inferiores lanceolato subulatæ 4–6 lin. longæ. Pedicelli graciles deflexi medio articulati inferiores 2–3ni 6–9 lin. longi. Perianthium omnino *D. humilis*. *Australia temperata orientalis.*

16. ECCREMIS, *Willd.*

Willd. MS., *teste Schult. fil. Syst. Veg.* vii. 354.—Antherici sp.' *Ruiz & Pav.*—Dianellæ sp., *H. B. K.*

Perianthium corollinum cæruleum 6-partitum marcescens, segmentis oblongis laxe multinervatis flore expanso patulis, exterioribus firmioribus ante anthesin valvatis. *Stamina* 6 hypogyna inclusa, antheris luteis ligulatis basifixis, filamentis medio incrassatis haud stupposis. *Ovarium* sessile triloculare, ovulis in loculo pluribus superpositis ; stylus filiformis, stigmate punctiformi. *Capsula* obovoidea, apice vetustate loculicide trivalvis, seminibus oblongis turgidis, testa crustacea nigra nitida. *Habitus* Dianellæ, *sed recedit filamentis haud stupposis, fructu capsulari.*

1. E. COARCTATA, *Baker*.—Anthericum coarctatum, *Ruiz et Pav. Peruv.* iii. 67, tab. 299. fig. A.—Stypandra? coarctata, *R. Br. Prod.* 279 ; *Kunth, Enum.* iv. 626.—Phalangium coarctatum, *Pers. Synops.* i. 368.—Dianella dubia, *H. B. K. Nov. Gen.* iii. 270, tab. 675 ; *Kunth, Enum.* v. 55. Acaulis vel breviter caulescens perennis 2–3-pedalis, fibris radicalibus duris. Folia basalia plura disticha caulem amplectentia linearia dura pedalia vel sesquipedalia 9–12 lin. lata glabra acute carinata subtiliter nervata. Caulis infra paniculam 1–2-pedalis, foliis pluribus, superioribus sensim brevioribus bracteatus. Panicula laxa 6–15-pollicaris, ramis pluribus brevibus ascendentibus apice corymbosis. Pedicelli cernui 6–12 lin. longi, apice articulati. Perianthium 6–8 lin. longum, segmentis exterioribus lanceolatis dorso viridulis, interioribus oblongis obtusis cæruleis 3–4 lin. latis. Stamina perianthio $\frac{1}{3}$ breviora. Stylus 4 lin. longus. Fructus 9–12 lin. longus niger lævis obtuse trilobatus. *Columbia*, Fendler 1552! Linden 136! Lobb 52! Goudot! Moritz 378! *Peruvia,* Matthews 1603! Spruce!

17. PASITHEA, *D. Don.*

D. Don, Edin. New Phil. Journ. 1832, 237 ; *Endl. Gen.* No. 1157 ; *Kunth, Enum.* iv. 634.—Antherici sp., *Ruiz et Pav.*

Perianthium corollinum cæruleum ad urceolum brevem 6-partitum, segmentis teneris subæqualibus flore expanso patulis dorso crebre 3–5-nervatis oblanceolatis obtusis post anthesin spiraliter contortis. *Stamina* 6 inclusa profunde perigyna, filamentis filiformibus, antheris oblongis luteis versatilibus. *Ovarium* sessile triloculare, ovulis in loculo paucis superpositis ; stylus filiformis ; stigma punctiforme. *Capsula* globosa membranacea loculicide trivalvis profunde obtuse lobata, seminibus in loculo sæpe solitariis subglobosis, testa crustacea nigra nitida, albumine carnoso.

1. P. CÆRULEA, *D. Don, loc. cit.* ; *Kunth, Enum.* iv. 635 ; *C. Gay, Fl. Chil.* vi. 133.—Anthericum cæruleum, *Ruiz et Pav. Flor. Peruv.* iii.

67, t. 299.—Phalangium cæruleum, *Pers. Syn.* i. 368.—Stypandra? cærulea, *R. Br. Prodr.* 279; *Hook. et Arn. Bot. Beech.* 49.—Cyanella Illcu, *Molina, Sag. Chil.* edit. 2, 130. Perennis glabra 3–4-pedalis. Fibræ radicales duræ gracillimæ. Collum radicis fibris intricatis copiosis vestitum. Folia 9–12 anguste linearia graminoidea 6–18 poll. longa, 3–4 lin. lata glabra subtiliter nervata persistentia. Caulis pedalis et ultra, foliis 1–2 reductis bracteatus. Panicula pedalis et ultra, ramis distantibus ascendentibus apice copiose corymbosis. Bracteæ minutæ lineares. Pedicelli 1–6 lin. longi inarticulati, inferiores floriferi cernui, fructiferi erecti. Perianthium 6–8 lin. longum saturate cæruleum. Stamina perianthio paulo breviora. Capsula 3 lin. crassa lævis ex apice profunde lobata. *Chili,* Cuming 483! Gaudichaud! Pöppig! Bertero! Bridges 29! Matthews 260! &c.

18. CHLOROPHYTUM, *Ker.*

Ker, Bot. Mag. 1071; *R. Brown, Prodr.* 277; *Schult. fil. Syst.* vii. 34, 452; *Endl. Gen.* No. 1147; *Kunth, Enum.* iv. 602 (excl. sp.).—Hartwegia, *Nees, Nova Acta,* xvii. 372; *Kunth, Enum.* iv. 607, *non Lindl.*—Asphodeliopsis, *Steud. in Hohen. Pl. Ind. Or. Exsic.* No. 1311.—Schidospermum, *Griseb. in Lechler, Pl. Peruv. Exsic.* No. 2382.—Antherici sp. *auct.*

Perianthium corollinum albidum 6-partitum marcescens, segmentis oblanceolatis vel oblongis flore expanso patentibus vel leviter revolutis, interioribus latioribus, omnibus dorso laxe 3–7-nervatis. *Stamina* 6 inclusa subæqualia hypogyna vel obscure perigyna; filamentis filiformibus glabris vel obscure papillosis; antheris linearibus versatilibus. *Ovarium* globosum sessile vel subsessile triloculare, ovulis in loculo 4–20 superpositis; stylus elongatus filiformis, stigmate minuto capitato. *Capsula* sessilis vel subsessilis, lateribus profunde acute angulatis, apice emarginata, loculicide trivalvis, seminibus discoideis, testa obscure nigra membranacea, albumine copioso. *Herbæ perennes, fibris radicalibus sæpe fusiformibus, foliis linearibus vel oblanceolatis membranaceis, scapo nudo vel foliis paucis reductis bracteato, floribus magnitudine parvis vel mediocribus semper albis racemoso-paniculatis. Habitus* Antherici § Phalangii, *recedit capsulæ lateribus acute angulatis, seminibus discoideis, foliis magis membranaceis sæpe oblanceolatis petiolatis.*

Cannæfolia. Folia lanceolata distincte petiolata.
Racemi densi simplices scapis brevissimis.
1. *C. Heynei.* 2. *C. Afzelii.* 3. *C. breviscapum.*

Racemi densi simplices scapis elongatis.
4. *C. arundinaceum.* 5. *C. macrophyllum.* 6. *C. glaucum.*
Racemi laxi simplices vel interdum furcati.
7. *C. inornatum.* 8. *C. alismæfolium.*
9. *C. sparsiflorum.* 10. *C. amplexicaule.*
Racemi laxi copiose paniculati.
11. *C. orchidastrum.* 12. *C. petiolatum.*
13. *C. Schidospermum.*

Anthericifolia. Folia linearia vel lorata haud petiolata.
Folia facie pubescentia .... 14. *C. vestitum.*
Folia facie glabra margine distincte ciliata. 15. *C. longifolium.*
16. *C. affine.* 17. *C. blepharophyllum.*
Folia facie et margine glabra.
Flores in umbellos subsessiles dispositi.
18. *C. acaule.* 19. *C. tetraphyllum.*
Flores racemoso-paniculati.
Racemi laxiflori.
Parviflori ...... 20. *C. laxiflorum.* 21. *C.alpinum.*
22. *C. modestum.*
Grandiflori.
23. *C. pubiflorum.* 24. *C. comosum.* 25. *C. Burchellii.*
26. *C. macrosporum.* 27. *C. nepalense.* 28. *C. elatum.*
Racemi densiflori.
Parviflori..... 29. *C. crispum.* 30. *C. stenopetalum.*
31. *C. malabaricum.* 32. *C. attenuatum.*
Grandiflori ... 33. *Bowkeri.* 34. *C. tuberosum.*

Juncifolium. Folia angustissima rigida.
Species sola .... 35. *C. juncifolium.*
Folia ignota .... 36. *C. Tinneæ.*

1. C. HEYNEI, *Baker.*—Anthericum Heynei, *Herb. Rottler.*—Fibræ radicales dense fasciculatæ cylindricæ interdum tuberiferæ, collo radicis setoso. Folia 6–9 oblanceolata glabra acuta semipedalia medio 1–1½ poll. lata, basi in petiolum latum canaliculatum 2–4 poll. longum angustata, venis perspicuis 20–25. Scapi brevissimi vix ultra 6–12 lin. longi. Racemus densus, fructifer 2–3 poll. longus. Bracteæ lineares vel lanceolatæ 3–9 lin. longæ. Pedicelli ascendentes prope apicem articulati, inferiores 2–3ni, 2–3 lin. longi. Perianthium 3 lin. longum, segmentis linearibus dorso laxe trinervatis. Capsula oblonga 4½ lin. longa acute triquetra, seminibus in loculo 6–8. *India orien-*

talis peninsularis, Heyne! Thomson! Hk. fil. & Thoms. Herb. Ind. No. 6! *Ceylon,* Thwaites 2291!

2. C. AFZELII, *Baker.* Fibræ radicales deorsum cylindrico-incrassatæ. Petioli distincti 2–5 poll. longi. Folia membranacea glabra lanceolata semipedalia e medio 12–15 lin. lato utrinque angustata acuta, venulis perspicuis 12–15. Scapus 1–2-pollicaris. Racemus simplex densus 2–3 poll. longus. Bracteæ imbricatæ deltoideo-cuspidatæ 1½ lin. longæ. Pedicelli ascendentes prope apicem articulati brevissimi, inferiores 3–4ni. Capsula obovoidea emarginata 4 lin. longa, 3 lin. lata. *Sierra Leone,* Afzelius! G. Don! (Herb. Mus. Brit.) Barry! (Herb. Lindley.).

3. C. BREVISCAPUM, *Dalzell in Kew Journ.* ii. 142; *Bombay Flora,* 252. Fibræ radicales dense fasciculatæ carnosæ cylindricæ, collo radicis breviter setoso. Folia 6–9 oblanceolata glabra membranacea 9–12 lin. lata acuminata, supra basin 4–6 lin. lata, dimidio inferiore angustata, venis 15–20 perspicuis. Scapus 3–6-pollicaris glaber ebracteatus. Racemi sæpissime simplices superne densi 2–3 poll. longi. Bracteæ lanceolatæ acuminatæ membranaceæ, superiores 3–4, inferiores 6–12 lin. longæ. Pedicelli apice articulati, inferiores 3–4ni, 3–4 lin. longi, fructiferi ascendentes vel patuli. Perianthium 4–4½ lin. longum album, segmentis dorso laxe trinervatis. Stamina perianthio paulo breviora, antheris 1–1½ lin. longis. Capsula depresso-globosa emarginata acute triquetra 4 lin. lata, seminibus in loculo 2–3. *Bombay,* Dalzell! Ritchie! Stocks!

4. C. ARUNDINACEUM, *Baker.* Fibræ radicales dense fasciculatæ deorsum incrassatæ cylindricæ, collo radicis parce setoso. Folia 6–8 membranacea oblanceolata glabra 6–12 poll. longa, medio 12–21 lin. lata acuta, basi in petiolum latum canaliculatum 2–4 poll. longum angustata, venis perspicuis 20–30. Scapus ½–1-pedalis teres ebracteatus. Racemus simplex raro furcatus 3–8 poll. longus superne densus. Bracteæ lanceolatæ 3–6 lin. longæ. Pedicelli ascendentes medio articulati, inferiores 2–3ni, fructiferi 3–4 lin. longi. Perianthium album, 4–4½ lin. longum, segmentis lanceolatis dorso laxe trinervatis. Antheræ acutæ 2 lin. longæ, filamenta glabra duplo superantes. Capsula depresso-globosa 4 lin. crassa, profunde emarginata, seminibus in loculo 3–4. *Himalayæ orientalis regio subtropicalis* (*Khasia, Sikkim, Bhotan,* 1000–4000 ped.), Hook. fil. et Thoms. Herb. Ind. no. 5! Griffith 5795! *Parasnath,* alt. 4000 pedum, Dr. Hooker!

5. C. MACROPHYLLUM, *Aschers. in Schwein. Beitr.* 294.—Anthericum macrophyllum, *A. Rich. Fl. Abyss.* ii. 334. Fibræ radicales dense fasciculatæ graciles, collo radicis haud setoso. Folia plura oblanceolata glabra membranacea 1–2-pedalia medio 2–3 poll. lata, basi in petiolum

latum canaliculatum 3–9 poll. longum angustata, venis perspicuis circiter 30. Scapus semipedalis vel pedalis, nudus vel superne bracteatus. Racemus simplex vel deorsum compositus, superne densus, 2–8 poll. longus. Bracteæ lanceolatæ membranaceæ, inferiores 9–12 lin. longæ. Pedicelli ascendentes, apice articulati, inferiores 3–6 lin. longi. Perianthium albidum 4–4½ lin. longum, segmentis 1½ lin. latis dorso 3–5-nervatis. Antheræ 1½ lin. longæ, filamentis æquilongæ. Capsula globosa 4–4½ lin. longa profunde emarginata, seminibus in loculo 2–3. *Abyssinia,* Schimper 1837! Quartin-Dillon et Petit! *Gallabat,* Schweinfurth! *In Nigritia ad Nupe,* Barter 1513! *Moramballa,* Dr. Kirk!; et plantam aliam affinem habemus ab Nupe (Barter!) foliis firmioribus angustioribus apice acuminatis, venis magis exsculptis, racemis tribus brevibus congestis, capsulis oblongo-emarginatis 5–6 lin. longis, perianthio ignoto, pedicellis fructiferis 1–2 lin. longis.

6. C. GLAUCUM, *Dalz. in Kew Journ.* ii. 142; *Bombay Flora,* 252.—Anthericum Nimmonii, *Grah. Bomb. Cat.* 220.—Hartwegia Nimmonii, *Dalz. in Herb. Kew.* Fibræ radicales densæ elongatæ carnosæ, collo radicis setoso. Folia 6–8 oblanceolata glabra membranacea 1–1½-pedalia supra medium 1–2 poll. lata acuta ad petiolum brevem latum angustata, venis perspicuis circiter 30. Scapus 1–2-pedalis, foliis multis reductis bracteatus. Racemus simplex densus ½–1-pedalis, 1 poll. latus. Bracteæ duræ persistentes lanceolatæ acuminatæ ante anthesin comosæ, inferiores 9–12 lin., superiores 3–4 lin. longæ. Pedicelli ascendentes, medio articulati, inferiores 2–3ni, 3–6 lin. longi. Perianthium album 4½–5 lin. longum, segmentis 1½ lin. latis dorso laxe 5-nervatis. Filamenta antheris æquilonga 1½ lin. longa papillosa. Stylus 3–4 lin. longus. Capsula globosa emarginata 3 lin. longa acute triquetra, seminibus in loculo 2–4. *India orientalis peninsularis,* Dalzell! Law! Stocks! Hook. fil. et Thoms. Herb. Ind. 2!

7. C. INORNATUM, *Gawl. Bot. Mag.* t. 1071; *Schult. fil. Syst.* vii. 453. *Kunth, Enum.* iv. 603. Fibræ radicales dense fasciculatæ cylindricæ carnosæ, collo radicis haud setoso. Folia glabra membranacea, petiolis distinctis 6–9 poll. longis, lanceolata acuminata 6–9 poll. longa infra medium 12–21 lin. lata, venis perspicuis 12–15. Scapus ½–1-pedalis gracilis ebracteatus. Racemus laxus 6–9-pollicaris simplex vel basi furcatus, rachi interdum puberula, internodiis 3–6 lin. longis. Bracteæ lanceolatæ 3–12 lin. longæ. Pedicelli ascendentes infra apicem articulati, inferiores 3–4ni vetustate 3–4 lin. longi. Perianthium alboviridulum 3–4 lin. longum, segmentis lanceolatis ¾–1 lin. latis dorso laxe trinervatis. Filamenta glabra 1½–2 lin. longa, antheris longiora. Capsula globosa 3 lin. longa. Ovula in loculo 5–6. *Sierra Leone,* Afzelius. *Ad ripas fluminis Gaboon,* Mann!

8. C. ALISMÆFOLIUM, *Baker.* Rhizoma obliquum, crassitie calami,

fibris paucis carnosis elongatis deorsum cylindrico-nodulosis, collo nullo modo setoso. Folia 4–6, petiolis distinctis canaliculatis 2–4 poll. longis, lanceolata glabra membranacea 5–6 poll. longa infra medium 7–10 lin. lata acuminata basi ad petiolum leviter rotundata, venis perspicuis 10–12. Scapi gracillimi 1–1½ poll. longi. Racemus laxissimus 3–4-pollicaris simplex vel furcatus, internodiis inferioribus 9–12 lin. longis. Bracteæ lanceolatæ, inferiores 3–4 lin. longæ. Pedicelli pubescentes, medio articulati, inferiores 2–3ni, 2–3 lin. longi, fructiferi patuli. Perianthium album 3 lin. longum, segmentis ½ lin. latis dorso laxe 2–3-nervatis. Capsula depresso-globosa 4 lin. lata, seminibus in loculo solitariis. *Africa æquinoctialis ad ripas fluminis Gaboon,* Mann 1030!

9. C. SPARSIFLORUM, *Baker.* Fibræ radicales elongatæ medio cylindrico-incrassatæ. Folia 5–6, petiolis distinctis 4–5 poll. longis, lanceolata membranacea glabra 6–8 poll. longa, medio 15–18 lin. lata acuta, basi longe attenuata, venis immersis tenuibus 12–15. Scapi gracillimi ebracteati pubescentes 6–8 poll. longi. Racemi laxissimi semipedales simplices vel basi furcati, internodiis 9–12 lin. longis, rachi subtiliter pubescente. Bracteæ lanceolatæ 3–6 lin. longæ, superiores deltoideæ. Pedicelli ascendentes medio articulati, inferiores 3–4ni, 1½–3 lin. longi. Perianthium non vidi. Capsula globosa acute triquetra 3 lin. longa, seminibus in loculo 4–6. *Fernando Po,* Mann 388!

10. C. AMPLEXICAULE, *Baker.* Folia lanceolata membranacea glabra, 6–8 poll. longa, medio 1–1½ poll. lata acuta ad basin scapum longe amplectentem angustata, venis crebris perspicuis circiter 40. Scapus gracilis ebracteatus 5–6-pollicaris. Racemi laxi simplices vel furcati 2–4 poll. longi. Bracteæ lineares minutæ 1½–3 lin. longæ. Pedicelli ascendentes 1½–2 lin. longi, medio articulati, inferiores 2–3ni. Perianthium 3 lin. longum, segmentis linearibus. Capsula oblonga emarginata 4–5 lin. longa, seminibus in loculo 4–6. *Ad ripas lacus Tanganyika,* Lieut. Cameron!

11. C. ORCHIDASTRUM, *Lindl. Hort. Trans.* vi. 79; *Bot. Reg.* t. 813; *Schult. fil. Syst.* vii. 453; *Kunth, Enum.* iv. 603.—C. Nimmoni, *Dalz. in Kew Journ.* ii. 142; *Bomb. Flora,* 252.—Phalangium oligospermum, *Wt. Icon.* t. 2038.—C. gallabatense, *Schwein. Pl. Gallab. Exsic.* Fibræ radicales cylindricæ carnosæ, collo radicis parce setoso. Folia 6–9 membranacea oblanceolata glabra 12–18 poll. longa, medio 2–3½ poll. lata acuta distincte nervata, basi in petiolum alatum 6–9 poll. longum angustata. Scapus crassus teres pedalis et ultra, superne folio unico reducto ebracteatus. Panicula laxissima 1–2-pedalis, ramis pluribus ascendentibus. Racemi laxissimi 6–12 poll. longi, internodiis inferioribus 1–1½ poll. longis. Bracteæ inferiores lanceolatæ 3–6 lin. longæ, superiores deltoideæ. Pedicelli ascendentes medio articulati, inferiores

3–4ni, 3–6 lin. longi. Perianthium album 4–4½ lin. longum, segmentis oblanceolatis dorso laxe 5-nervatis. Antheræ ligulatæ 2 lin. longæ filamenta duplo superantes. Capsula depresso-globosa profunde emarginata 4 lin. lata, 3 lin. longa, seminibus in loculo 4–5. *Sierra Leone,* G. Don! *Gallabat,* Schweinfurth! *Abyssinia,* Beccari 185! *Zambesi-land ad Lupata,* Dr. Kirk! *India orientalis peninsularis,* Stocks! Dalzell! Wight! &c.

12. C. PETIOLATUM, *Baker.* Fibræ radicales carnosæ cylindricæ semipedales prope basin fusiformes, collo radicis haud setoso. Petioli distincti 6–8 poll. longi, basi dilatati. Lamina oblonga membranacea acuminata, 6–7 poll. longa, medio 2½–3 lin. lata basi deltoidea, venis perspicuis circiter 20. Scapus gracilis ebracteatus 7–8-pollicaris. Racemi 3 ascendentes laxi 4–5 poll. longi, internodiis inferioribus 6–9 lin. longis. Bracteæ deltoideo-cuspidatæ, inferiores 1½–2 lin. longæ. Pedicelli ascendentes medio articulati, inferiores 3–4ni, 3–4 lin. longi. Perianthium viridulum 4 lin. longum segmentis dorso viridi carinatis crebre trinervatis. Antheræ 1½ lin. longæ, filamentis paulo breviora. Stylus 2½ lin. longus. Capsula globosa 3 lin. crassa profunde emarginata acute triquetra, seminibus in loculo 2–3. *Montes Cameroons, ad* 2000 *pedes,* Mann 2132!

13. C. SCHIDOSPERMUM, *Baker.*—Schidospermum Sanseviera, *Griseb. in Lechler Pl. Peruv. Exsic.* no. 2382. Rhizoma lignosum, fibris radicalibus filiformibus elongatis. Folia plura oblanceolata 4–8 poll. longa 12–15 lin. lata acuta in petiolum brevem basi membranaceo-dilatatum angustata membranacea glabra, venis perspicuis inæqualibus 12–20 crassioribus. Scapus 3–15-pollicaris, foliis multis bracteiformibus instructus. Racemi multi laxi paniculati; centrales 2–4 poll. longi, expansi 4 lin. lati. Bracteæ perminutæ lanceolatæ vel superiores deltoideæ. Pedicelli patentes solitarii inarticulati ½–1 lin. longi. Perianthium 1½ lin. longum, segmentis oblongis dorso late brunneis laxe nervatis. Stamina perianthio paulo breviora, antheris oblongis minutis, filamentis elongatis glabris. Capsula globosa sessilis 1½ lin. longa, lateribus profunde excavatis. *Peruvia in sylvis umbrosis ad San Govan,* Lechler 2382!

14. C. VESTITUM, *Baker.* Fibræ radicales graciles, collo radicis haud setoso. Folia plura linearia graminoidea falcata 6–12 poll. longa, 3–4 lin. lata haud petiolata utrinque ad faciem pubescentia, venis crebris perspicuis 15–20. Scapi gracillimi pubescentes 3–4 poll. longi ebracteati vel superne folio unico parvo prædíti. Racemus laxissimus simplex vel furcatus 3–5 poll. longus, internodiis inferioribus 6–8 lin. longis. Bracteæ plurimæ deltoideo-cuspidatæ minutæ, infimæ lineari-subulatæ. Pedicelli medio articulati, floriferi patuli 3–4 lin. longi, fructiferi ascendentes. Perianthium viridulum 2 lin. longum, segmentis oblanceolato-spathulatis dorso trinervatis. Stamina perianthio paulo breviora. Capsula depresso-globosa 4 lin. lata, 3 lin. longa,

acute triquetra, seminibus in loculo 3–4. *In ditione fluminis Zambesi ad Shupanga,* Dr. Kirk!

15. C. LONGIFOLIUM, *Schwein. Beitr.* 294.—Anthericum longifolium, *A. Rich. Fl. Abyss.* ii. 333. Rhizoma horizontale crassitie digiti, fibris radicalibus cylindricis carnosis, collo dense setoso. Folia plura lineari-lorata membranacea pedalia medio 6–9 lin. lata acuminata haud petiolata distincte subtiliter ciliata, venis crebris perspicuis circiter 30. Scapus teres ebracteatus 15–18 poll. longus. Racemus simplex, superne densus, 3–5 poll. longus. Bracteæ scariosæ lanceolato-subulatæ, inferiores 5–6 lin. longæ. Pedicelli brevissimi ascendentes apice articulati, inferiores 2–3ni, 1½–2 lin. longi. Perianthium 4 lin. longum. Stamina perianthio æquilonga, filamentis glabris 3 lin. longis. Stylus longe exsertus. Capsula obovoidea 4 lin. longa profunde emarginata, seminibus in loculo 2. *Gallabat,* Schweinfurth! *Abyssinia,* Quartin-Dillon!

16. C. AFFINE, *Baker, Linn. Journ.* xxix. 160, t. 104. Fibræ radicales graciles dense fasciculatæ, collo radicis breviter setoso. Folia 6–9 lineari-lorata acuminata 12–15 poll. longa, 9–12 lin. lata faciebus glabris marginibus distincte ciliatis, e basi ad apicem sensim angustata, venis perspicuis crebris 25–30. Scapi teretes ebracteati 6–9 poll. longi. Racemus simplex 3–9 poll. longus, superne subdensus, internodiis inferioribus 9–15 lin. longis. Bracteæ membranaceæ lanceolatæ ciliatæ 9–18 lin. longæ. Pedicelli ascendentes medio articulati, inferiores gemini 6–8 lin. longi. Perianthium album 6 lin. longum, segmentis dorso laxe trinervatis. Stamina perianthio duplo breviora, antheris 1½ lin. longis, filamentis glabris. Capsula globosa 4 lin. longa acute triquetra emarginata, seminibus in loculo 2–3. *Africa æquinoctialis in ditione Rubuga* 5° 40′ S. *lat., alt.* 3800 *pedum,* Col. Grant!

17. C. BLEPHAROPHYLLUM, *Schwein. Fl. Gallab. Exsic.* no. 9. Fibræ radicales graciles, collo radicis setis densis fibrosis 1–2 poll. longis cincto. Folia 3–4 lanceolata acuminata membranacea basin scapi amplectentes centralia 6–9 poll. longa medio 9–12 lin. lata marginibus distincte ciliatis, venis perspicuis 20–25. Scapus semipedalis ebracteatus. Racemi densi simplices vel furcati 1–2 poll. longi. Bracteæ lanceolatæ acuminatæ, infimæ 4–6 lin. longæ. Pedicelli brevissimi, medio articulati, infimi 1–2 lin. longi. Perianthium viridulum 4–4½ lin. longum, segmentis linearibus dorso distincte 5-nervatis. Stamina perianthio distincte breviora, antheris luteis 1½ lin. longis. Capsula acute triquetra 4 lin. longa profunde emarginata. *Gallabat,* Schweinfurth! *Africa australis in ditione Transvaal,* Baines! (Perianthium non vidi.)

18. C. ACAULE, *Baker.* Fibræ radicales graciles demum cylindricæ dense fasciculatæ, collo radicis dense setoso. Folia 6–9-pedalia glabra

anguste linearia graminoidea 3–4 lin. lata crebre nervata. Flores 2–5 in corymbum sessilem dispositi, pedicellis erectis strictis inarticulatis 4–10 lin. longis. Perianthium non vidi. Capsula oblonga 4 lin. longa acute triquetra emarginata, seminibus in loculo 4–5. *India orientalis* (sine designatione loci specialis), Jerdon!

19. C. TETRAPHYLLUM, *Baker*.—Scilla tetraphylla, *Linn. fil. Suppl.* 203; *Kunth, Enum.* iv. 331.—Phalangium abyssinicum, *Kunth, Enum.* iv. 598.—Asphodelus Chamæmoly, *Hochst. in Schimp. Abyss. Exsic.* no. 271.—Anthericum Chamæmoly, *Hochst. in Schimp. Abysi. Exsic.* no. 1369. Fibræ radicales 3–4 poll. longæ deorsum cylindrico-carnosæ, collo radicis breviter setoso. Folia 4–12 lanceolata glabra membranacea 4–6 poll. longa medio 6–9 lin. lata margine nuda, venis perspicuis immersis 12–15. Flores 12–30 in umbellas breviter stipitatas dispositi, bracteis linearibus 6–9 lin. longis, pedicellis gracillimis inarticulatis 3–12 lin. longis. Perianthium album 2½–3 lin. longum, segmentis lanceolatis 1 lin. latis dorso laxe trinervatis. Stamina perianthio ⅓ breviora, filamentis antheris æquilongis. Ovula in loculo 6–8. Capsulam maturam non vidi. *Abyssinia*, Schimper 271! 322! 1203! (Exsic. ann. 1863–8), Quartin-Dillon et Petit 185! (Exempla typicalia *Scillæ tetraphyllæ* adsunt in herbariis Linnæi et Smithii.)

20. C. LAXIFLORUM, *R. Br. Prod.* 227; *Schult. fil. Syst.* vii. 452; *Kunth, Enum.* iv. 603.—Phalangium falcatum, *Wall. Cat.* no. 5057; *Kunth, Enum.* iv. 600.—Chlorophytum falcatum, *Baker in Saund. Ref. Bot.* t. 333.—C. xerotinum, *F. Mull. Frag.* i. 63.—C. parviflorum, *Dalz. in Kew Journ.* ii. 141; *Bomb. Flora,* 251! *Hochst. in Schimp. Pl. Abyss.* no. 2231.—Phalangium parviflorum, *Wt. Icones,* t. 2039.—Anthericum parviflorum, *Benth. Flor. Hongkong,* 373.—Nolina? javanica, *Hassk. Cat. Bogor.* 27! *Miquel, Flor. Ned. Ind.* iii. 554. —C. abyssinicum, *Kots. et Peyr. Pl. Tinn.* 46. Fibræ radicales dense fasciculatæ elongatæ interdum carnosæ nodulosæ, collo radicis parce setoso. Folia 6–12 falcata anguste linearia glabra graminoidea 6–12 poll. longa, 2–3 lin. lata subdisticha, venis crebris perspicuis. Scapus gracilis flexuosus 1–3-pollicaris. Racemi laxissimi, simplices vel furcati 3–12 poll. longi, internodiis inferioribus 6–15 lin. longis. Bracteæ minutæ lanceolatæ. Pedicelli medio articulati, fructiferi cernui, inferiores gemini 2–3 lin. longi. Perianthium album 1½–2 lin. longum, segmentis ligulatis ½ lin. latis dorso obscure 3-nervatis. Stamina perianthio paulo breviora, antheris minutis, filamentis glabris. Capsula depresso-globosa (3 lin. lata) profunde emarginata et angulata, seminibus in loculo 2–4. *Ab Australia tropicali per Indiam orientalem et Abyssiniam ad Guineam.*

21. C. ALPINUM, *Benth. in Fl. Austral. inedit.*—Cæsia? alpina, *Hook. fil. Fl. Tasm.* ii. 373. Fibræ radicales cylindricæ. Folia ad rosulam 3–4 anguste linearia glabra 4–6 poll. longa. Scapus subnullus. Ra-

cemus simplex laxissimus 1–1½-pollicaris flexuosus, bracteis minutis deltoideis, pedicellis solitariis vel geminis, superioribus brevissimis, inferioribus 1½–2 lin. longis. Perianthium 2 lin. longum viridulum, segmentis anguste oblongis dorso laxe trinervatis. Capsula parva globosa profunde lobata. *Tasmania ad montes occidentales,* Archer!

22. C. MODESTUM, *Baker.* Fibræ radicales elongatæ cylindricæ. Folia 12–20 membranacea linearia glabra 6–9 poll. longa, 3–4 lin. lata, in petiolum canaliculatum angustata, venis perspicuis 10–12. Scapus angulatus gracilis semipedalis medio bractea parva præditus. Racemi simplices vel furcati laxissimi 3–6 poll. longi, internodiis inferioribus 1 poll. longis. Bracteæ lanceolatæ 2–3 lin. longæ. Pedicelli 1–2ni ascendentes medio articulati 1–2 lin. longi. Perianthium albidum 2½–3 lin. longum, segmentis oblanceolatis dorso crebre trinervatis. Stamina perianthio paulo breviora, antheris minutis, filamentis glabris. Capsula obovoidea profunde emarginata, seminibus in loculo 3–4. *Natalia,* Krauss 177!

23. C. PUBIFLORUM, *Baker.* Rhizoma repens crassitie digiti minimi, fibris radicalibus tenuibus, collo haud setoso. Folia plura linearia graminoidea glabra 1½–3 pedes longa, 6–9 lin. lata acuminata, venis crebris perspicuis 20–25. Scapus 1–3-pedalis teres glaber, superne bracteis 1–2 parvis linearibus suffultus. Racemi 3–5 laxissimi ascendentes, centrales 9–12 poll. longi, internodiis inferioribus 6–12 lin. longis. Bracteæ minutæ deltoideæ imbricatæ. Pedicelli 4–6ni, medio articulati, fructiferi 4–6 lin. longi. Perianthium viridulum, extus puberulum, 4 lin. longum, segmentis dorso laxe trinervatis. Stamina perianthio vix breviora, filamentis antheris triplo brevioribus. Capsula 4 lin. lata, 2½–3 lin. longa, acute triquetra, seminibus in loculo 4–6. *Africa tropicalis austro-orientalis in ditione fluminis Zambesi,* Dr. Kirk!

24. C. COMOSUM, *Baker.*—Anthericum comosum, *Thunb. Prod.* 63; *Flor. Cap.* 323; *Schult. fil. Syst.* vii. 475.—Phalangium comosum, *Poir. Ency.* v. 252.—Hartwegia comosa, *Nees, Nov. Act.* xv. 2, 373; *Kunth, Enum.* iv. 607.—Cæsia comosa, *Spreng. Syst. Veg.* ii. 88; *Kunth, Enum.* iv. 610.—Anthericum Sternbergianum, *Schult. fil. Syst.* vii. 1693.—C. Sternbergianum, *Steud.* Fibræ radicales dense fasciculatæ. Folia radicalia plura linearia membranacea glabra 12–15 poll. longa, medio 6–9 lin. lata, ad apicem acutum et basin angustata, venis 12–15 perspicuis. Scapus 1–2-pedalis gracilis, glaber, foliis paucis reductis bracteatus. Racemi 1–6 laxissimi, rosulis foliorum sæpe e nodis et apice productis, 6–12 poll. longi, internodiis inferioribus 1½–2 poll. longis. Bracteæ lanceolatæ 3–4 lin. longæ, superiores deltoideo-cuspidatæ. Pedicelli supra medium articulati ascendentes vel floriferi cernui, inferiores 3–6ni, 2–4 lin. longi. Perianthium album 4–4½ lin. longum, segmentis reflexis ligulatis 1–1½ lin. latis dorso laxe

distincte 3–5-nervatis. Filamenta papillosa 3 lin. longa; antheræ parvæ post anthesin tortæ. Capsula latiora (3 lin.) quam longa, seminibus in loculo 3–5. *Cap. B. Spei,* Thunberg! etc. *Natal,* Cooper 3313! sæpe in hortis cultum.

25. C. BURCHELLII, *Baker.* Fibræ radicales cylindricæ, collo radicis parce setoso. Folia 12–20 glabra membranacea linearia acuta pedalia, medio 6–9 lin. lata, ad petiolum brevem attenuata, venis perspicuis 15–20. Scapus simplex gracilis 6–10-pollicaris, foliis 1–2 parvis linearibus bracteatus. Racemi simplices laxi 4–6 poll. longi, internodiis inferioribus 6–9 lin. longis. Bracteæ minutæ deltoideæ. Pedicelli ascendentes medio articulati, inferiores 3–4ni. Perianthium albidum 6 lin. longum, segmentis oblanceolatis 1 lin. latis dorso laxe trinervatis. Filamenta glabra 2–2½ lin. longa. Capsulam non vidi. *Cap. B. Spei,* Burchell 3650!

26. C. MACROSPORUM, *Baker.* Folia membranacea lorata glabra bipedalia 6–8 lin. lata, venis perspicuis 12–15. Scapus validus teres 2–3-pedalis, foliis 2–3 bracteiformibus præditus. Panicula laxissima bipedalis, ramis strictis erecto-patentibus. Racemus centralis pedalis, internodiis inferioribus 1–1½ poll. longis. Bracteæ minutæ deltoideæ. Pedicelli ascendentes medio articulati, inferiores 4–6ni, 6–12 lin. longi. Perianthium album 4–5 lin. longum, segmentis dorso trinervatis. Filamenta glabra 2½ lin. longa, antheris parvis oblongis. Capsula oblonga emarginata 7–8 lin. longa, lateribus profunde acute angulatis, seminibus in loculo 5–6 discoideis 2 lin. latis. *Cap. B. Spei in ditione Transvaal,* Baines!

27. C. NEPALENSE, *Baker.*—Phalangium nepalense, *Lindl. in Hort. Trans.* vi. 277; *Bot. Reg.* i. 988; *Kunth, Enum.* iv. 597.—Anthericum nepalense, *Spreng. Syst. Veg. Cur. post.* 135; *Schult. fil. Syst.* vii. 468.—C. undulatum, *Wall. Cat.* no. 5059. Fibræ radicales vix incrassatæ, collo radicis haud setoso. Folia 8–15 linearia glabra graminoidea 6–18 poll. longa, 3–9 lin. lata, ad basin attenuata, venis multis perspicuis. Scapus 1–2-pedalis nudus vel superne folio unico parvo bracteatus. Racemi sæpe plures ascendentes laxissime paniculati, centrales sæpe pedales, expansi 15–18 lin. lati. Bracteæ lanceolatæ, inferiores 9–12 lin. longæ. Pedicelli ascendentes vel floriferi cernui, medio articulati, inferiores 2–3ni, 6–9 lin. longi. Perianthium album 6–8 lin. longum, segmentis lanceolatis 1½ lin. latis dorso obscure laxe 5–7-nervatis. Antheræ ligulatæ 3 lin. latæ, filamenta glabra duplo superantes. Capsula obovoidea glabra 4–5 lin. longa acute triquetra, seminibus in loculo 4–8. *Regio subtropicalis Himalayæ orientalis (Nepaul, Khasia, Sikkim, Silhet),* Wallich! Hook. fil. et Thomson! Griffith 5792! 5793! 5794!

28. C. ELATUM, *R. Brown, Prod.* 277; *Schult. fil. Syst.* vii. 454;

Baker, Ref. Bot. t. 216.—Asphodelus capensis, *Linn. Syst. Veg.* edit. x. 982.—Anthericum elatum, *Ait. Hort. Kew.* i. 448 (*Miller, Ic.* t. 56). —Phalangium elatum, *Red. Lil.* t. 191.—P. fasciculatum, *Poir. Ency.* v. 246. Fibræ radicales graciles, collo radicis haud setoso. Folia 9–20 lorata 1–2-pedalia 12–18 lin. lata membranacea glabra ad basin attenuata venis æqualibus perspicuis 20–30. Scapus teres glaber subpedalis, foliis magnis linearibus 2–3 bracteatus. Racemi laxissimi copiose paniculati stricti ascendentes, centralis 6–9-pollicaris, expansus 12–15 lin. latus. Bracteæ minutæ deltoideæ scariosæ. Pedicelli ascendentes medio articulati, inferiores 2–6ni, 1–3 lin. longi. Perianthium album 5–6 lin. longum, segmentis revolutis oblanceolatis dorso obscure laxe trinervatis. Stamina perianthio duplo breviora, antheris oblongis ½ lin. longis filamentis scabris. Ovula in loculo 5–6. Stylus declinatus, interdum exsertus. Capsula globosa 3 lin. longa profunde angulata. *Cap. B. Spei*, Hort. Fothergill, anno 1779! Drège 8719! MacOwan 119! 1967 ("sæpe proliferum"), Cooper 54! *Orange Free State*, Cooper 3592! *Natal*, hort. Veitch.! ANTHERICUM VARIEGATUM, *Floral Mag.* n. s. tab. 152, est forma foliis albo variegatis.

29. C. CRISPUM, *Baker.*—Anthericum crispum, *Thunb. Prodr.* 63; *Flor. Cap.* 324.—Bulbine crispa, *Schult. fil. Syst.* vii. 448; *Kunth, Enum.* iv. 568. Fibræ radicales elongatæ deorsum cylindricæ carnosæ, collo radicis squamis parvis membranaceis cincto. Folia 6–9 parva lanceolata membranacea 2–3 poll. longa, medio 3–4 lin. lata, ad basin et apicem acutum angustatum margine crispata, pilis brevibus albidis patulis ciliata. Scapus 3–6-pollicaris teres glaber flexuosus, foliis 2–3 minutis bracteiformibus præditus. Racemi 1–6 ascendentes laxissimi pauciflori, centrales 3–4 poll. longi, internodiis inferioribus 1–1½ poll. longis. Bracteæ perminutæ deltoideæ. Pedicelli ascendentes prope basin articulati, inferiores gemini 2–3 lin. longi. Perianthium album 4 lin. longum. Stamina perianthio duplo breviora, filamentis glabris. Capsula globosa 3 lin. longa, angulis acutis. *Cap. B. Spei*, Thunberg! Zeyher 1069! Bowker!

30. C. STENOPETALUM, *Baker.* Fibræ radicales graciles dense fascicuculatæ, collo radicis haud setoso. Folia oblanceolata vix petiolata 9–12 poll. longa, 12–15 lin. lata glabra arundinacea acuminata e medio ad basin canaliculatam 3 lin. latam angustata, venis crebris perspicuis circiter 40. Scapus subnullus. Racemus densus simplex 2–3-pollicaris. Bracteæ lanceolatæ 3–6 lin. longæ. Pedicelli brevissimi ascendentes, inferiores 2–3ni. Perianthium 2½–3 lin. longum, segmentis linearibus ½ lin. latis. Antheræ 1 lin. longæ, filamentis æquilongæ. Stylus exsertus 3 lin. longus. Ovula in loculo pauca. Capsulam non vidi. *Ad ripas fluminis Niger ad Nupe*, Barter!

31. C. MALABARICUM, *Baker.* Fibræ radicales cylindricæ carnosæ, collo

radicis haud setoso. Folia 6–12 oblanceolata falcata glabra membranacea 4–6 poll. longa medio 9–12 lin. lata, venis perspicuis 12–15. Scapus simplex ebracteatus 3–4-pollicaris. Racemus simplex superne densus 2–3 poll. longus, expansus 9–12 lin. latus. Bracteæ magnæ lanceolatæ, inferiores 6–9 lin. longæ. Pedicelli ascendentes, medio articulati, inferiores 2–3ni, fructiferi 5–6 lin. longi. Perianthium albidum 3–4 lin. longum, segmentis oblanceolatis dorso laxe trinervatis. Stamina perianthio paulo breviora, filamentis glabris 2 lin. longis. Capsula depresso-globosa 3 lin. lata apice profunde emarginata, seminibus in loculo 2–5. *Malabar ad Baboodum hills,* Law! *Neilgherries,* Wight!

32. C. ATTENUATUM, *Baker.*—Phalangium attenuatum, *Wt. Icones,* t. 2037.—Asphodelopsis arangadinensis, *Steud. in Hohen. Pl. Ind. Or.* no. 1311. Fibræ radicales cylindricæ dense fasciculatæ, collo radicis dense setoso. Folia 6–9 linearia membranacea glabra 9–15 poll. longa medio 6–12 lin. lata acuta ad basin angustata, venis 15–20 distinctis immersis. Scapus glaber ebracteatus 6–18-pollicaris. Racemus simplex raro furcatus 3–6-pollicaris superne densus. Bracteæ lanceolatæ, superiores 2–3, inferiores 6–12 lin. longæ. Pedicelli ascendentes medio articulati, inferiores 2–3ni, fructiferi 3–4 lin. longi. Perianthium album 3–5 lin. longum, segmentis oblanceolatis dorso crebre 3–5-nervatis. Stamina perianthio paulo breviora, filamentis papillosis antheris longioribus. Capsula globosa acute triquetra 4 lin. longa, seminibus in loculo 3–4. *India orientalis peninsularis,* Wight! Stocks! Hohenacker! Hook. fil. et Thoms. Herb. Ind. 8!

33. C. BOWKERI, *Baker.* Fibræ radicales carnosæ cylindricæ. Folia 5–6 membranacea glabra lorato-lanceolata 12–16 poll. longa, 1–1½ poll. lata, ad apicem attenuata, saturate viridia, venis perspicuis immersis. Scapus teres pedalis, foliis 1–2 bracteiformibus instructus. Racemus simplex pedalis densus, expansus 15–18 lin. latus. Bracteæ lineari-subulatæ 6–9 lin. longæ ante anthesin comosæ. Pedicelli ascendentes medio articulati, inferiores gemini 3 lin. longi. Perianthium album 6 lin. longum, segmentis oblongis dorso brunneo-carinatis crebre distincte 5–6-nervatis. Filamenta filiformia glabra 2–2½ lin. longa. Ovarium sessile oblongum, ovulis in loculo 15–20. Stylus declinatus 3–4 lin. longus. Capsulam non vidi. *Cap. B. Spei,* Bowker! (V. v. in Hort. Kew.)

34. C. TUBEROSUM, *Baker.*—Anthericum tuberosum, *Roxb. Cor.* ii. 20, t. 138; *Flor. Ind.* 149.—Phalangium tuberosum, *Kunth, Enum.* iv. 598; *Wt. Icon.* t. 2036.—P. indicum, *Kunth, Enum.* iv. 598.—Chlorophytum anthericoideum, *Dalz. in Kew Journ.* ii. 141; *Bomb. Flora,* 251.—A. ornithogaloides, *Hochst. in Schimp. Pl. Abyss.* no. 1261; *A. Rich. Fl. Abyss.* ii. 232.—Phalangium ornithogaloides, *Schwein.*

Beitr. 294.—P. alatum, *Ham. in Wall. Cat.* no. 5056.—P. niveum, *Poir. Ency.* v. 248; *Kunth, Enum.* iv. 599.—Anthericum niveum, *Schult. fil. Syst.* vii. 480. Fibræ radicales densissimæ cylindricæ carnosæ, collo radicis fibroso. Folia 6–12 lanceolata falcata membranacea glabra 6–12 poll. longa medio 6–12 lin. lata acuminata, venis crebris immersis. Scapus teres ebracteatus 3–12 poll. longus. Racemi simplices vel parce paniculati densi 2–4 poll. longi, expansi 15–18 lin. lati. Bracteæ lanceolatæ acuminatæ, inferiores 6–9 lin. longæ. Pedicelli ascendentes, medio articulati, inferiores gemini 4–6 lin. longi. Perianthium album 5–7 lin. longum, segmentis oblongis dorso laxe 7–9-nervatis. Stamina perianthio $\frac{1}{3}$ breviora, antheris magnis 2 lin. longis, filamentis brevioribus glabris. Capsula obovoidea nitida 4–5 lin. longa, seminibus in loculo 3–4. *India peninsularis,* Heyne! Konig! Dalzell! Stocks! etc. *Poonah,* Jacquemont 371! *Himalaya orientalis,* Hamilton! *Prome,* Wallich! *Abyssinia,* Schimper 561! 1261! *Callabat,* Schweinfurth!

35. C. JUNCIFOLIUM, *Baker.* Folia dura angustissima rigida glabra sesquipedalia medio $\frac{1}{4}$ lin. lata dorso rotundata facie canaliculata distincte 5-nervata basi membranaceo-dilatata stupposa. Scapi gracillimi teretes flexuosi 6–9 poll. longi, bracteis 1–2 parvis scariosis præditi. Racemi laxissimi simplices semipedales, internodiis inferioribus 1–2 poll. longis. Bracteæ minutæ deltoideæ. Pedicelli ascendentes prope apicem articulati, inferiores 4–8 lin. longi. Perianthium 2–2$\frac{1}{2}$ lin. longum, segmentis ligulatis dorso late viridibus indistincte laxe 4–5-nervatis. Filamenta 1 lin. longa glabra distincte perigyna. Capsula glabra obovoidea 4–5 lin. longa, lateribus profunde angulatis, seminibus 2 superpositis discoideis. *Entre Rios,* Tweedie!

36. C. TINNEÆ, *Baker.*—Chlorophytum, sp., *Kots. & Peyr. Pl. Tinn.* 46, t. 23 B. Glaberrimum, foliis ignotis. Scapus gracillimus $\frac{1}{2}$–1-pedalis, foliis pluribus linearibus bracteiformibus præditus. Racemus laxissimus semipedalis, internodiis inferioribus 9–12 lin. longis. Bracteæ minutæ lanceolatæ. Pedicelli ascendentes 1–2 lin. longi, inferiores 2–3ni. Perianthium 2$\frac{1}{2}$ lin. longum, segmentis oblongis dorso trinervatis. Stamina perianthio paulo breviora, antheris filamenta glabra duplo superantibus. Ovula in loculo 12. *In finibus Æthiopum Djur prope Bongo,* Expeditio Tinneana.

19. BOTTINÆA, *Colla.*

Colla, Pl. Chil. i. 7, tab. 1 (1831).—Trichopetalum, *Lindl. Bot. Reg.* tab. 1535 (1832); *Endl. Gen.* No. 1148; *Kunth, Enum.* iv. 601.—Antherici sp., *R. & P.*

Perianthium album corollinum 6-partitum, segmentis linearibus dorso viridulis distincte trinervatis, interioribus facie et margine barbatis. *Stamina* 6 inclusa profunde perigyna, filamentis glabris filiformibus, antheris parvis oblongis versatilibus. *Ovarium* sessile oblongum triloculare, ovulis in loculo 12–16 biseriatis horizontalibus, stylo filiformi, stigmate punctiformi. *Capsula* sessilis oblonga, obtuse trilobata, seminibus pluribus crebris, testa nigra, albumine copioso. *Habitus omnino* Antherici. *Recedit perianthii segmentis barbatis.*

1. B. THYSANOTOIDES, *Colla, loc. cit.* 45.—Trichopetalum stellatum, *Lindl. Bot. Reg.* sub t. 1535; *Kunth, Enum.* iv. 601.—T. gracile, *Lindl. Bot. Reg.* t. 1535; *Kunth, Enum.* iv. 602.—Anthericum plumosum, *Ruiz et Pav. Flor. Peruv.* iii. 68, t. 300. fig. 6; *Bot. Mag.* t. 3084; *Hook. et Arn. Beech.* ii. 49. Glabra 1–3-pedalis, fibris radicalibus incrassatis carnosis, collo radicis haud setoso. Folia 6–8 anguste linearia glabra graminoidea 4–12 poll. longa, 1–3 lin. lata. Scapus ½–1-pedalis, foliis 1–3 reductis bracteatus. Racemi stricti laxissimi pauciflori simplices vel parce furcati 3–6 poll. longi. Bracteæ productæ lineares vel lanceolatæ. Pedicelli ascendentes apice articulati, inferiores gemini, unicum productum 12–21 lin. longum. Perianthium 6–7 lin. longum, segmentis dorso late viridi carinatis, interioribus dense barbatis. Capsula 6–8 lin. longa, seminibus in loculo pluribus rotundato-compressis. *Chili,* Gaudichaud! Bertero 697! 1356! Cuming 423! etc.

20. THYSANOTUS, *R. Br.*

R. Br. Prodr. 282; *Schult. fil. Syst.* vii. 33, 435; *Endl. Gen.* No. 1150; *Kunth, Enum.* iv. 613.—Chlamysporum, *Salisb. Parad. Lond.* t. 103.—Isandra *et* Thysanella, *Salisb. Gen.* 67.—Ornithogali sp., *Labill.*

Perianthium corollinum purpureum 6-partitum, segmentis marcescentibus post anthesin haud contortis flore expanso patentibus, tribus exterioribus firmioribus dorso viridulis ante anthesin subvalvatis, tribus interioribus membranaceis fimbriatis dorso viridulo carinatis. *Stamina* 6 inclusa, 3 sæpissime minora vel abortiva, filamentis brevissimis filiformibus profunde perigynis nudis, antheris basifixis elongatis curvatis poris apicalibus dehiscentibus. *Ovarium* sessile oblongum, ovulis in loculo geminis; stylus filiformis curvatus; stigma punctiforme. *Capsula* membranacea globosa loculicide trivalvis, seminibus turgidis basi arillo carnoso cupulato cinctis, albumine copioso, testa nigra crustacea. *Herbæ pleræque australienses, caulibus*

duris simplicibus vel 2–3chotome ramosis, foliis angustis duris omnibus radicalibus sæpe parvis siccis scariosis, floribus in umbellas multifloras vel paucifloras interdum unifloras dispositis, pedicellis medio articulatis singulis basi bracteatis.

Subgenus CHALAMYSPORUM (*Salisb.*). Antheræ 6 productæ inæquales.

Herbæ erectæ, foliis tempore florationis productis semipedalibus vel pedalibus.
Folia glabra.
Umbellæ plures pedunculatæ.
1. *T. tuberosus.* 2. *T. thyrsoideus.* 3. *T. scaber.*
Umbellæ plures laterales sessiles, et terminales.
4. *T. Baueri.* 5. *T. tenuis.* 6. ***T. paniculatus.***
Umbellæ solitariæ terminales .... 7. ***T. chinensis.***
Folia muricata .... 8. *T. asper.*
Herbæ duræ erectæ vel diffusæ, foliis tempore florationis parvis siccis scariosis.
Rami teretes ascendentes.
Caules conformes.
9. *T. junceus.* 10. *T. gracilis.* 11. *T. sparteus.*
Caules biformes, alteri steriles, alteri floriferi.
12. ***T. arbuscula.***
Rami teretes, ramulis ultimis divaricatis.
13. ***T. dichotomus.*** 14. ***T. flexuosus.***
Rami alati complanati .... 15. ***T. anceps.***
Herba late volubilis .... 16. ***T. Patersoni.***

Subgenus THYSANELLA (*Salisb.*). Antheræ 3 æquales, 3 abortivæ.

Umbellæ solitariæ.
Umbellæ multifloræ. 17. *T. triandrus.* 18. ***T. multiflorus.***
Umbellæ paucifloræ.
Folia glabra .... 19. ***T. pauciflorus.***
Folia hispidula................................ 20. ***T. hispidulus.***
Umbellæ plures in paniculam corymbosam dispositæ.
21. ***T. glaucus.*** 22. ***T. Drummondii.***

1. T. TUBEROSUS, *R. Br. Prod.* 283; *Kunth, Enum.* iv. 613; *F. M. Frag.* vii. 69; *Charsl. Wild Flow.* tab. 6. fig. 1.—T. exasperatus, *F. Muell. Frag.* i. 22; *Walp. Ann.* vi. 136.—T. tenuis, *Endl. Pl. Preiss.* ii. 37, *non Lindl.* Fibræ radicales infra apicem oblongo-carnosæ. Folia basalia 1 vel plura lineari-filiformia glabra canailculata semipedalia vel pedalia ½ lin. lata. Scapus ½–1-pedalis strictus teres glaber.

Flores 12–50 in paniculas sæpe corymbosas dispositi, ramis strictis erecto-patentibus, umbellis 1–3- raro 4–5-floris sæpissime pedunculatis. Bracteæ ultimæ plures deltoideæ vel lanceolatæ 1 lin. longæ. Pedicelli 3–6 lin. longi erecti vel cernui, infra medium articulati. Perianthium 6–8 lin. longum, segmentis exterioribus linearibus 1 lin. latis, interioribus oblongis purpureis 3 lin. latis. Stamina 6 inæqualia, filamentis ½ lin. longis complanatis, antheris longioribus curvatis 3 lin. longis. Capsula oblonga 2–2½ lin. longa. *Australia temperata orientalis et occidentalis.* T. ELATIOR, *R. Br. Prodr.* 283, est forma elata multiflora. T. INTRICATUS, *Endl. Pl. Preiss.* ii. 37 (Preiss 1563) *non Lindl.*, est verisimiliter forma magna elata ramosa hujus speciei, ramis ultimis 6–9 poll. longis.

2. T. THYRSOIDEUS, *Baker.* Fibræ radicales dense fasciculatæ basi oblongo-tuberosæ. Folia basalia plura subteretia glabra semipedalia vel pedalia ½–1 lin. lata. Scapus ½–1-pedalis strictus teres glaber. Flores 20 in paniculam rhomboideam thyrsoideam 3–9 poll. longam dispositi, ramis strictis erecto-patentibus, ramulis 3–9 lin. longis, umbellis 1–2-floris omnibus pedunculatis. Bracteæ plures lanceolatæ 1 lin. longæ, Pedicelli 3–4 lin. longi, prope basin articulati, ascendentes vel cernui. Perianthium 5–6 lin. longum, segmentis exterioribus linearibus, interioribus oblongis. Stamina perianthio duplo breviora, antheris inæqualibus, majoribus 3 lin. longis. Capsula oblonga 2 lin. longa. *Australia temperata occidentalis,* Drummond ! Burgess !

3. T. SCABER, *Endl. Pl. Preiss.* ii. 37. Fibræ radicales filiformes. Folia radicalia plura crassa anguste linearia pedalia supra basin 1½–2 lin. lata, venis sub lente muricatis. Scapus teres scaber 1–1½-pedalis. Flores 20–50 in paniculam corymbosam dispositi, ramis ultimis strictis ascendentibus 1–3 poll. longis, umbellis 4–5-floris omnibus pedunculatis. Bracteæ viridulæ ovato-lanceolatæ 1½–2 lin. longæ. Pedicelli 4–6 lin. longi, supra basin articulati. Perianthium 5–6 lin. longum, segmentis exterioribus linearibus, interioribus oblongis purpureis. Stamina 6, antheris inæqualibus. *Australia occidentalis temperata,* Drummond ! Preiss 1578 !

4. T. BAUERI, *R. Br. Prodr.* 283 ; *Kunth, Enum.* iv. 614.—T. Banksii *a*, *R. Br. Prodr.* 283; *Kunth, loc. cit.*—T. undulatorum, *Behr teste Muell. Exsic.* Fibræ radicales fasciculatæ prope basin tuberosæ. Folia plura filiformia glabra semipedalia vel pedalia ⅓–½ lin. lata. Scapus nudus teres strictus ¼–1-pedalis. Rachis inflorescentiæ simplex vel parce furcata, umbellis pluribus 3–4-floris multis sessilibus. Bracteæ scariosæ lanceolatæ vel deltoideæ 1–1½ lin. longæ. Pedicelli 3–4 lin. longi prope basin articulati. Perianthium 4–4½ lin. longum, segmentis et antheris *T. tuberosi.* Capsula oblonga 2 lin. longa. *Australia temperata meridionalis.* T. BANKSII *a*, *R. Br.*, a flumine Endeavour,

a typo solum recedit umbellis 5–8-floris. T. ISANTHERUS, *Lindl. Bot. Reg.* t. 655, *non R. Br.*, est forma inter typum et *T. tuberosum* intermedia, paniculis rhomboideis compositis, umbellis pluribus pedunculatis, lateralibus sæpe sessilibus.

5. T. TENUIS, *Lindl. Bot. Reg.* 1838, t. 50; *Kunth, Enum.* iv. 617; *Endlich. Pl. Preiss.* ii. 37.—T. tenellus, *Endl. Pl. Preiss.* ii. 37. Fibræ radicales dense fasciculatæ, prope basin tuberosæ. Folia plura glabra filiformia semipedalia ½–1 lin. lata. Scapus 3–6-pollicaris superne scaber. Flores 12–40 in paniculam densam corymbosam dispositi, ramis brevibus striatis angulatis ascendentibus, umbellis 1–4-floris terminalibus et lateralibus sessilibus. Bracteæ viridulæ lanceolatæ vel deltoideæ 1–1½ lin. longæ. Pedicelli 2–4 lin. longi prope basin articulati. Perianthium 4 lin. longum, segmentis exterioribus linearibus, interioribus oblongis teneris purpureis. Stamina perianthio duplo breviora, antheris inæquilongis. Capsula oblonga 2 lin. longa. *Australia temperata occidentalis ad flumen Cygni,* Drummond 802! T. TENELLUS, *Endl.* (Preiss 1577!), est forma debilis umbellis omnibus unifloris.

6. T. PANICULATUS, *R. Br. Prod.* 283; *Kunth, Enum.* iv. 614. Fibræ radicales fasciculatæ prope basin tuberosæ. Folia plura filiformia glabra pedalia ½ lin. lata. Scapus 6–9-pollicaris strictus teres glaber. Panicula rhomboidea semipedalis, ramis strictis erecto-patentibus simplicibus vel furcatis, ramulis 1–2 poll. longis, umbellis unifloris multis lateralibus sessilibus. Bracteæ lanceolatæ 1 lin. longæ purpureo carinatæ. Pedicelli erecti 3–4 lin. longi supra basin articulati. Perianthium 6–7 lin. longum, segmentis interioribus fimbriatis 1½ lin. latis. Antheræ inæquales. *Australia in ditione Queensland ad Broad Sound,* R. Brown!

7. T. CHINENSIS, *Benth. Flor. Honkong.* 372; *Hance, Ann. Sc. Nat.* ser. 5, vol. v. p. 245; *Linn. Journ.* xiii. 129.—T. chrysantherus, *F. Muell. Exsic.* Fibræ radicales densissimæ gracillimæ haud tuberosæ. Folia plura glabra subteretia facie canaliculata 6–8 poll. longa ⅓ lin. lata. Scapus simplex teres strictus 6–9-pollicaris. Umbellæ 4–8-floræ solitariæ terminales. Bracteæ plures minutæ deltoideæ. Pedicelli 4–8 lin. longi prope basin articulati, exteriores cernui. Perianthium 4 lin. longum, segmentis interioribus anguste oblongis fimbriatis. Antheræ inæquales, filamentis brevissimis, majores 1½ lin. longæ. Capsula 2 lin. longa oblonga membranacea. *Hong-kong et China meridionalis,* Hance 3882! *Insulæ Philippinæ,* Cuming 981! *Australia tropicalis borealis,* Armstrong 562! F. Mueller! Schultz 377! T. ISANTHERUS, *R. Br. Prod.* 283, *non Bot. Reg.* t. 655 (Isandra, *Salisb. Gen.* 67), ab sinu Regis Georgii, est verisimiliter forma ejusdem speciei antheris subæquilongis.

8. T. ASPER, *Lindl. Swan River*, 58; *Kunth, Enum.* iv. 617, *non Endl.* Dense cæspitosus, fibris radicalibus gracilibus haud tuberiferis. Folia radicalia plura subulata semipedalia ½ lin. crassa, ubique pilis hispidis brevibus albidis patentibus vestita. Caules simplices vel raro furcati teretes duri striati hispidi pedales et ultra. Umbellæ terminales 2–5-floræ, bracteis lanceolatis albidis scariosis 1½–2 lin. longis. Pedicelli erecti 3–6 lin. longi, prope basin articulati. Perianthium 8–9 lin. longum, segmentis interioribus oblongis. Stamina 6 inæqualia, antheris majoribus 6–7 lin. longis. *Australia occidentalis ad flumen Cygni*, Drummond!

9. T. JUNCEUS, *R. Br. Prod.* 283; *Bot. Mag*, t. 2351; *Bot. Reg.* t. 656; *Kunth, Enum.* iv. 615; *F. Muell. Frag.* vii. 69.—Chlamysporum juncifolium, *Salisb. Parad.* t. 103. Rhizoma reptans tuberosum, fibris radicalibus haud incrassatis. Folia radicalia tempore florationis subnulla. Caulis strictus teres glaber durus 1–2-pedalis, ramis paucis sæpissime simplicibus ascendentibus 1–4 poll. longis apice umbellatis. Bracteæ ovatæ membranaceæ 1 lin. longæ. Umbellæ 1–3-floræ, pedicellis 2–4 lin. longis supra basin articulatis. Perianthium 5-6 lin. longum, segmentis interioribus oblongis. Stamina inæqualia, antheris majoribus 3–4 lin. longis. Capsula oblonga membranacea 2 lin. longa. *Australia temperata orientalis*, R. Brown! Sieber 514! etc.

10. T. GRACILIS, *R. Br. Prod.* 283; *Kunth, Enum.* iv. 615. Rhizoma gracile reptans, fibris radicalibus haud incrassatis. Caulis 1–1½-pedalis suberectus foliis basalibus tempore florationis subnullis, 2–3chotome furcatus, ramis gracillimis teretibus glabris, ultimis erecto-patentibus 1–3 poll. longis. Umbellæ terminales 1–2-floræ, bracteis deltoideis ½ lin. longis. Pedicelli 2–3 lin. longi erecti vel cernui, supra basin articulati. Perianthium 4–4½ lin. longum. Stamina 6 inæqualia. *Australia occidentalis ad Sinum Regis Georgii*, R. Brown! Ad *T. junceum* arcte accedit, sed gracilior magis diffusa, bracteis et floribus minoribus. T. ELONGATUS, *R. Br. Prod.* 283, est verisimiliter forma robustior magis ramosa ejusdem speciei.

11. T. SPARTEUS, *R. Br. Prodr.* 283; *Kunth, Enum.* iv. 615; *Endl. Pl. Preiss.* ii. 37; *F. Muell. Frag.* vii. 69. Rhizoma tuberosum breviter reptans, fibris radicalibus tenuibus. Folia tempore florationis parva scariosa. Caulis durus teres procumbens vel erectus glaber vel setosus 1–2-pedalis supra basin 2–3chotome ramosus, ramulis ultimis brevibus racemosis vel corymbosis, ad apicem et interdum secus latera umbellatis. Umbellæ 1–3-floræ, bracteis membranaceis deltoideis 1–1½ lin. longis. Pedicelli 3–6 lin. longi, supra basin articulati, ascendentes vel cernui. Perianthium 6–8 lin. longum, segmentis interioribus oblongis purpureis fimbriatis. Antheræ inæquales, majores 3–4 lin. longæ. *Australia occidentalis et meridionalis*, R. Brown!

Drummond 312! Preiss 1565! etc. T. DEFORMIS, *R. Br.* 284, est forma caule procumbente ramis brevibus ascendentibus ad nodos fasciculatis. T. INTRICATUS, *Endl. Pl. Preiss.* ii. 37, *non Lindl.* (*Preiss.* 1563!), *et* T. ANCEPS, *Endl. Pl. Preiss.* ii. 37, *non Lindl.* (*Preiss.* 1564!), sunt verisimiliter formæ hujus speciei.

12. T. ARBUSCULA, *Baker.* Rhizoma tuberosum reptans, fibris radicalibus haud incrassatis. Folia radicalia tempore florationis minuta sicca scariosa. Caules biformes, alteri breviores, 4–8 poll. longi supra medium copiose trichotome paniculati, ramulis gracillimis confertis ascendentibus puberulis ½–1 poll. longis omnibus sterilibus, alteri pedales vel sesquipedales erecti supra medium paniculati ramis paucioribus laxioribus apice floriferis. Umbellæ 2–3-floræ, bracteis lanceolatis scariosis ½–1 poll. longis, pedicellis 3–4 lin. longis supra basin articulatis. Perianthium 5–6 lin. longum, segmentis interioribus oblongis saturate purpureis. Stamina 6 inæqualia, antheris majoribus 3–4 lin. longis. *Australia occidentalis ad flumen Cygni,* Drummond!

13. T. DICHOTOMUS, *R. Br. Prod.* 284; *Kunth, Enum.* iv. 615; *F. Muell. Frag.* vii. 69.—Ornithogalum dichotomum, *Labill. Pl. Nov. Holl.* i. 73, t. 109.—T. divaricatus, *R. Br. Prod.* 284; *Kunth, Enum.* iv. 615.—T. intricatus, *Lindl. Bot. Reg.* 1838, *Misc.* No. 111, 1840, tab. 4; *Kunth, Enum.* iv. 617.—T. Lindleyanus, *Endl. Pl. Preiss.* ii. 36. Caules erecti 2–4-pedales, foliis radicalibus tempore florationis parvis siccis scariosis, duri teretes stricti supra basin copiose 2–3chotome paniculati, ramulis strictis divaricatis 6–24 lin. longis apice solum floriferis. Umbellæ 1–4-floræ, bracteis perminutis, pedicellis 3–4 lin. longis prope basin articulatis. Perianthium 6–7 lin. longum, segmentis interioribus oblongis saturate purpureis. Stamina 6 inæqualia, antheris majoribus 3–4 lin. longis. Capsula oblonga 3 lin. longa. *Australia temperata præsertim occidentalis,* Labillardière! R. Brown! Drummond! Oldfield 619! Preiss 1569! etc.

14. T. FLEXUOSUS, *R. Br. Prod.* 284; *Kunth, Enum.* iv. 616. Fibræ radicales graciles elongatæ haud tuberiferæ. Caulis 3–4-pollicaris, foliis basalibus perparvis filiformibus, a basi copiose 2–3chotome ramosus, ramulis tetragonis acute angulatis ¼–½ poll. longis patulis vel recurvatis. Umbellæ terminales unifloræ, bracteis deltoideis ⅓–¼ lin. longis. Pedicelli cernui prope basin articulati 1–1½ lin. longi. Perianthium 3–3½ lin. longum, antheris inæqualibus. *Australia occidentalis ad sinum Regis Georgii,* R. Brown!

15. T. ANCEPS, *Lindl. Swan River,* 58; *Kunth, Enum.* iv. 617, *non Endl.* Caules pedales vel sesquipedales glabri duri supra basin dichotome paniculati, distincte alati, 1–1½ lin. lati, ramis paucis erecto-patentibus sæpissime simplicibus 1–6 poll. longis apice solum floriferis, ad latera interdum minute bracteatis. Umbellæ 1–3-floræ,

bracteis deltoideis vel lanceolatis ½–1 lin. longis. Pedicelli 2–3 lin. longi supra basin articulati. Perianthium 5–6 lin. longum, segmentis interioribus oblongis. Stamina 6, antheris inæqualibus, majoribus 3 lin. longis. *Australis occidentalis ad flumen Cygni*, Drummond!

16. T. Patersoni, *R. Br. Prodr.* 284; *Kunth, Enum.* iv. 616; *Hook. fil. Fl. Tasm.* ii. 54; *F. Muell. Frag.* vii. 69. Fibræ radicales cylindricæ carnosæ fasciculatæ. Folia basalia tempore florationis parva sicca scariosa. Caules gracillimi glabri late volubiles, ramis brevibus corymbosis, ramulis tetragonis flexuosis minute bracteatis. Flores terminales sæpissime solitarii, pedicellis 1–1½ lin. longis, basi bracteis 2 minutis deltoideis præditis. Perianthium 3–4 lin. longum, segmentis interioribus ligulatis 1 lin. latis. Stamina 6, antheris inæqualibus 1–1½ lin. longis. Capsula subglobosa 2–2½ lin. longa. *Tasmania et Australia temperata orientalis.* T. Menziesii, *R. Br.* (*Prodr.* 284; *Kunth, Enum.* iv. 616.—T. Manglesianus, *Kunth, Enum. loc. cit.*; *Endl. Pl. Preiss.* ii. 37), est varietas occidentalis robustior pedicellis longioribus floribus majoribus 5–6 lin. longis. *Australia occidentalis ad flumen Cygni et sinum Regis Georgii*, Menzies! Drummond! Mangles! Preiss 1568! etc.

17. T. triandrus, *R. Br. Prod.* 284; *Kunth, Enum.* iv. 617.—Ornithogalum triandrum, *Labill. Pl. Nov. Holl.* i. 84, t. 110. Dense cæspitosus, fibris radicalibus tenuibus haud tuberiferis. Folia radicalia plura crassa rigida subteretia 4–9 poll. longa ½ lin. crassa tomentosa facie canaliculata. Scapus teres sæpissime simplex foliis subæquilongus. Umbellæ solitariæ terminales 12–20-floræ. Bracteæ plures lanceolateæ 2–3 lin. longæ margine scariosæ. Pedicelli 3–9 lin. longi medio articulati. Perianthium 5–6 lin. longum, segmentis interioribus oblongis saturate purpureis. Stamina 3, filamentis brevissimis, antheris 3 lin. longis. *Australia temperata occidentalis*, Labillardière! R. Brown! Drummond! Preiss 1571! (forma pedalis umbella 30-flora pubescentia laxiore). Oldfield 621! etc.

18. T. multiflorus, *R. Br. Prod.* 285; *Kunth, Enum.* iv. 617.—T. proliferus, *Lindl. Bot. Reg.* 1838, t. 8; *Kunth, Enum. loc. cit.*—T. brevipes, *Endl. Pl. Preiss.* ii. 38. Dense cæspitosus, fibris radicalibus tenuibus haud tuberiferis. Folia radicalia plura erecta rigida complanata glabra pedalia et ultra 1 lin. lata crebre nervata. Scapus anceps durus glaber 1–2-pedalis. Umbellæ sæpissime solitariæ terminales 10–40-floræ. Bracteæ lanceolatæ viridulæ 3 lin. longæ. Pedicelli ascendentes medio articulati 9–12 lin. longi. Perianthium 6–7 lin. longum, segmentis interioribus oblongis. Stamina 3, antheris æqualibus 3 lin. longis. Capsula oblonga 3 lin. longa. *Australia temperata occidentalis*, Cuming! Drummond! Preiss 1572! Oldfield! etc. T. proliferus, *Lindl.*, est forma umbella parva laterali infra pri-

mariam prædita. T. BREVIPES, *Lindl.* (*Preiss* 1753 !) est forma nana pauciflora.

19. T. PAUCIFLORUS, *R. Br. Prodr.* 285; *Kunth, Enum.* iv. 618. Dense cæspitosus, fibris radicalibus tenuibus haud tuberiferis. Folia plura filiformia glabra erecta 2–6 poll. longa basi membranaceo-dilatata. Scapus simplex teres glaber foliis subæquilongus. Umbellæ solitariæ 1–4-floræ terminales, bracteis lanceolatis 2 lin. longis, pedicellis 1½–2 lin. longis prope basin articulatis. Perianthium 4 lin. longum. Stamina 3, perianthio duplo breviora, antheris æqualibus 1½ lin. longis. *Australia occidentalis ad sinum Regis Georgii,* R. Brown!

20. T. HISPIDULUS, *R. Brown, Prodr.* 225; *Kunth, Enum.* iv. 618.—T. nanus, *Endl. Pl. Preiss.* ii. 38. Dense cæspitosus, fibris radicalibus tenuibus haud tuberiferis. Folia radicalia stricta erecta 2–3 poll. longa subulata ½ lin. lata pilis brevibus albidis hispidis patulis ubique vestita. Scapus simplex 1–4 poll. longus. Umbellæ solitariæ terminales 3–4-floræ, bracteis lanceolatis 2–3 lin. longis, pedicellis bracteis brevioribus medio articulatis. Perianthium 4½–5 lin. longum. Stamina 3, antheris æqualibus. *Australia occidentalis in ditione Hay,* Preiss 1574! *Ad sinum Regis Georgii,* R. Brown!

21. T. GLAUCUS, *Endl. Pl. Preiss.* ii. 38. Dense cæspitosus, fibris radicalibus fasciculatis elongatis gracillimis haud tuberiferis. Folia radicalia densissima erecta glabra subulata stricta 3–4 poll. longa ⅙–¼ lin. crassa. Scapus rigidus teres gracilis foliis duplo longior. Flores 4–30 in paniculam corymbosam dispositi, umbellis 1–4-floris, ramis strictis erecto-patentibus 6–18 lin. longis. Bracteæ lanceolatæ membranaceæ 1–1½ lin. longæ. Pedicelli 2–4 lin. longi supra basin articulati. Perianthium 5–6 lin. longum. Stamina 3, antheris æqualibus. *Australia temperata occidentalis,* Preiss 1575! Drummond!

22. T. DRUMMONDII, *Baker.* Fibræ radicales dense fasciculatæ deorsum tuberiferæ. Folia radicalia densa filiformia glabra gracillima flaccida 6–8 poll. longa ⅙ lin. crassa. Scapus gracillimus teres glaber foliis æquilongus vel superans. Umbellæ 5–6 2–3-floræ in paniculam corymbosam dispositi, ramis erecto-patentibus ½–1 poll. longis. Bracteæ 1 lin. longæ lanceolato-deltoideæ margine late scariosæ dorso viridulæ. Pedicelli 3–6 lin. longi ascendentes vel cernui. Perianthium 4½ lin. longum. Stamina 3, perianthio duplo breviora. *Australia occidentalis ad flumen Cygni,* Drummond in herb. DC!

21. BULBINE, *Linn.*

Linn. Hort. Cliff. 122; *Willd. Enum.* 372; *Schultes fil. Syst. Veg.* vii. 24, 442, *ex parte*; *Kunth, Enum.* iv. 563.—Anthericum, *Linn. Gen.* No. 422 *ex parte* ; *Juss. Gen.* 52 ; *R. Brown, Prodr.* 275 ; *Endl. Gen.* No. 1145 *ex parte* ; *Baker in Trimen's Journ.* i. 100, *ex parte.*

Perianthium corollinum 6-partitum marcescens, segmentis ligulatis obtusis flavis raro albidis dorso 1-nervatis viridi vittatis æqualibus, flore expanso patentibus. *Stamina* 6 obscure perigyna, filamentis filiformibus subrectis inclusis, omnibus vel raro tribus dense conspicue barbatis, antheris oblongis versatilibus. *Ovarium* sæpissime sessile globosum triloculare, ovulis in loculo 2–6 superpositis ; stylus filiformis rectus vel leviter declinatus ; stigma punctiforme. *Capsula* membranacea globosa loculicide trivalvis, seminibus parvis paucis triquetris nigris vel brunneis, albumine corneo. *Herbæ acaules vel caulescentes foliis carnosis rosulatis, racemis simplicibus sæpissime densis, floribus speciosis parvis luteis, bracteis parvis angustis membranaceis, pedicellis solitariis apice articulatis.*

Subgenus EUBULBINE. Filamenta omnia stupposa.

Folia subulata crassitie calami vel graciliora.
  Caulescentes.
    Folia viridia facie plana............ 1. *B. caulescens.*
    Folia glauca facie canaliculata ... 2. *B. rostrata.*
  Acaules.
    Perennes, cormo magno tuberoso. 3. *B. favosa.*
      4. *B. minima.* 5. *B. filifolia.*
    Perennes, cormo tuberoso subnullo.
      6. *B. longiscapa.* 7. *B. asphodeloides.*
      8. *B. bulbosa.* 9. *B. annua.*
Folia subulata crassitie digiti minimi.
  Folia dorso rotundata.
      10. *B. præmorsa.* 11. *B. pugioniformis.*
  Folia utrinque sulcata .... 12. *B. bisulcata.*
Folia plana anguste linearia 3–6 lin. lata.
  Bracteæ minutæ deltoideæ.
      13. *B. laxiflora.* 14. *B. Zeyheri.*
  Bracteæ lanceolatæ ante anthesin comosæ.
      15. *B. narcissifolia.* 16. *B. densiflora.*
Folia parva rotundato-spathulata dorso convexa.
      17. *B. mesembryanthemoides.*
Folia magna lanceolata vel oblongo-lanceolata.
    Perianthium albidum .... 18. *B. urgineoides.*

Perianthium luteum .... 19. *B. alooides.*
20. *B. nutans.* 21. *B. latifolia.*
Albiflora, foliis ignotis .... 22. *B. dubia.*
Subgenus TRIPOGON. Filamenta interiora stupposa, exteriora nuda .... 23. *B. semibarbata.*

1. B. CAULESCENS, *Linn. Hort. Cliff.* 122; *Dill. Elth.* tab. 231. fig. 298.—B. frutescens, *Willd. Enum.* 372; *Schult. fil. Syst.* vii. 442; *Kunth, Enum.* iv. 564.—Anthericum frutescens, *Linn. Sp.* 445; *Bot. Mag.* t. 816; *DC. Plantes, Grasses,* t. 14; *Red. Lil.* t. 284. Perennis, caulescens, caulibus demum pedalibus vel bipedalibus, ramosis, 3–4 lin. crassis, basibus foliorum delapsorum vestitis. Folia 8–10 sublaxe disposita disticha ascendentia subulata acuminata 6–9 poll. longa supra basin dilatatam 3–4 lin. crassa viridia carnosa facie plana, dorso rotundata. Scapus 1–1½-pedalis gracilis teres. Racemus 6–18 poll. longus, superne densus, inferne laxus, expansus 1½–2 poll. latus. Bracteæ deltoideæ longe cuspidatæ basi fimbriatæ 2–3 lin. longæ. Pedicelli inferiores decurvati 6–8 lin. longi, superiores breviores ascendentes. Perianthium 4 lin. longum, segmentis ligulatis luteis flore expanso reflexis 1 lin. latis. Stamina perianthio duplo breviora, filamentis alternis magis stupposis. Stylus 1½ lin. longus. Capsula globosa magnitudine pisi, seminibus in loculo 3–4 tetragonis nigris. *Cap. B. Spei,* Drège 8762! Cooper 3306! Macowan 1893! Burke! etc. V. v. in Hort. Kew.

2. B. ROSTRATA, *Willd. Enum.* 372; *Schult. fil. Syst. Veg.* vii. 442; *Kunth, Enum.* iv. 564.—Anthericum rostratum, *Jacq. Coll. Suppl.* 82; *Ic.* ii. 17, t. 403.—B. incurva, *Schult. fil. Syst.* vii. 446; *Kunth, Enum.* iv. 566.—Anthericum incurvum, *Thunb. Prod.* 62; *Flor. Cap.* 319. Perennis, caulibus sæpe cæspitosis demum semipedalibus, 3–4 lin. crassis, basibus scariosis foliorum delapsorum vestitis. Folia 6–8 subdisticha conferta ascendentia subulata glauco-viridia, in planta sylvestri sæpe 2–4 poll. longa 1–1½ lin. crassa, inculta 6–9 poll. longa, 2–3 lin. crassa facie profunde canaliculata, dorso teretia. Scapus gracilis ½–1-pedalis. Racemus 4–12 poll. longus superne densus inferne laxus, expansus 1½–2 poll. latus. Bracteæ longe cuspidatæ 1½–2 lin. longæ. Pedicelli inferiores 5–6 lin. longi, post anthesin decurvati. Perianthium 4 lin. longum, segmentis luteis ligulatis viridi vittatis 1 lin. latis. Stamina perianthio duplo breviora. Capsula globosa, magnitudine pisi, seminibus in loculo 3–4, *Cap. B. Spei,* Drège 8742! Zeyher 1057! 1059! Burchell 2279! 3618! etc. A. INCURVUM, *Thunb.*, est forma sylvestris gracilis foliis 1 lin. crassis 15–18 lin. longis, scapo spithamæo, racemo laxo paucifloro: *Zeyher* 1058!

3. B. FAVOSA, *Schult. fil. Syst.* vii. 444; *Kunth, Enum,* iv. 564.—Anthericum favosum, *Thunb. Prodr.* 63; *Fl. Cap.* edit. 2, 231.

Perennis, acaulis, cormo magnitudine *Rapæ* mediocris prædita, collo copiose setoso. Folia plura subulata carnosa pedalia supra basin 1–1½ lin. crassa. Scapus teres fragilis 1–1½-pedalis basi 1–1½ lin. crassus. Racemus laxus 4–6 poll. longus, expansus 10–12 lin. crassus. Bracteæ minutæ deltoideæ cuspidatæ 1 lin. longæ. Pedicelli ascendentes, inferiores 2–3 lin., superiores 1 lin. longi. Perianthium flavidum, segmentis teneris 1 lin. latis. Filamenta perianthio subduplo breviora, omnia dense stupposa. Stylus filiformis declinatus. Capsulam non vidi. *C. B. Spei*, Thunberg!

4. B. MINIMA, *Baker*. Perennis, acaulis, cormo tuberoso magnitudine nucis avellanæ prædita, collo haud setoso. Folia 6–9 rosulata subulata glabra ascendentia 1–1½ poll. longa ¼ lin. crassa. Scapi ex cormo 1–2 filiformes 1½–2 poll. longi. Racemi laxissime 6–10-flori expansi 1–2 poll. longi, 6–9 lin. lati. Bracteæ perminutæ deltoideæ. Pedicelli diu ascendentes, inferiores 2–4 lin. longi. Perianthium 2 lin. longum, segmentis flore expanso reflexis. Stamina perianthio subtriplo breviora, filamentis dense stupposis. Stylus 1½ lin. longus. Capsulam non vidi. *C. B. Spei*, Drège 953!

5. B. FILIFOLIA, *Baker*. Cormus tuberosus 6–9 lin. crassus, collo setis 1–2 poll. duris copiosis erectis cincto. Folia plura dura glabra subteretia 6–12 poll. longa ½ lin. crassa. Scapus ½–1-pedalis gracilis teres ebracteatus. Racemus laxus simplex 1½–3 poll. longus, expansus 9–10 lin. crassus, 8–15-florus. Bracteæ minutæ deltoideo-cuspidatæ. Pedicelli ascendentes solitarii, inferiores 2–3 lin. longi. Perianthium luteum 3 lin. longum, segmentis ½ lin. latis distincte viridi vittatis. Stamina perianthio paulo breviora, antheris minutis, filamentis stupposis. Stylus 1½ lin. longus. Capsulam non vidi. *Cap. B. Spei in summo monte Tandjesberg prope Graaf-Reinet, alt.* 4900 *pedum*, Bolus 762!

6. B. LONGISCAPA, *Willd. Enum.* 372; *Schult. fil. Syst.* vii. 443; *Kunth, Enum.* iv. 564.—Anthericum longiscapum, *Jacq. Coll. Suppl.* 84; *Ic.* ii. 17, t. 404; *Red. Lil.* t. 423; *Bot. Mag.* t. 1339.—A. asphodeloides, *Ait. Hort. Kew.* i. 450, *non L.*—A. altissimum, *Mill. Dict.* edit. 6, no. 8 (*Icones*, 26, t. 39); *Baker, Trimen's Journ.* i. 136.—A. lagopus, *Thunb. Prodr.* 63.—Bulbine Mettinghii, *Ten. Syll. App.* p. 563; *Kunth, Enum.* iv. 568, *teste Bertol. Fl. Ital.* iv. 131. Perennis, subacaulis, cormo tuberoso nullo. Folia 12–20 dense rosulata subulata carnosa intense glauca 8–12 poll. longa supra basin dilatatam 3–4 lin. crassa facie plana dorso teretia margine integerrima. Scapus angulatus firmus glaucus 1–1½-pedalis. Racemus superne densissimus 12–18 poll. longus, expansus 21–24 lin. latus. Bracteæ lanceolatæ subulatæ 3–6 lin. longæ basi dense ciliatæ, ante anthesin conspicue comosæ. Pedicelli inferiores patuli vel cernui 6–9 lin. longi. Peri-

anthium pallide flavum, 4–4½ lin. longum, segmentis teneris viridi-vittatis 1–1½ lin. latis flore expanso reflexis. Filamenta perianthio duplo breviora omnia stupposa. Stylus declinatus 3 lin. longus. Capsulam non vidi. *Cap. B. Spei,* Thunberg! Hort. Jacquin! Hort. Kew.! Bowker! etc.

7. **B. ASPHODELOIDES,** *Schult. fil. Syst.* vii. 444; *Kunth, Enum.* iv. 564.—Anthericum asphodeloides, *Linn. Sp.* 446; *Jacq. Hort. Vind.* ii. 85, t. 181; *Mill. Dict.* edit. 6, no. 6.—Bulbine abyssinica, *A. Rich. Fl. Abyss.* ii. 334, t. 97.—B. graminea, *Haw. Revis. Pl. Suec.* 33? Perennis, cormo tuberoso nullo, stolonibus copiosis, fibris radicalibus cylindricis 3–4 poll. longis. Folia 10–20 dense rosulata subulata erecta glauca 6–9 poll. longa supra basin dilatatam 1–1½ lin. crassa, facie planiuscula, dorso rotundata, quasi speciebus reliquis firmiora. Scapus firmus strictus angulatus 6–12-pollicaris. Racemus sæpissime densus, 3–6 poll. longus, expansus 2–2½ poll. latus. Bracteæ lanceolatæ acuminatæ membranaceæ 3–6 lin. longæ ante anthesin comosæ. Pedicelli fructiferi sæpissime patuli, inferiores6–9 lin. longi. Flores suaveolentes, odore citri. Perianthium aurantiacum, 4 lin. longum, segmentis oblongis 1½–2 lin. latis. Stamina perianthio triplo breviora, filamentis stupposis. Stylus leviter declinatus 1½–2 lin. longus. Capsula obovoidea 3–4 lin. longa, seminibus in loculo 3–4 triquetris rugosis. *C. B. Spei,* Burchell 1711! 2002! 2258! 2089! 6822! Wright 220! Zeyher 1692! 4227! Cooper 878! Macowan 1834! *Natal,* Gerrard 357! *Abysinia,* Schimper 505! Quartin-Dillon et Petit 177!

8. **B. BULBOSA,** *Haw. Revis.* 33; *Schult. fil. Syst.* vii. 445; *Kunth, Enum.* iv. 567; *Charsley, Wild Flowers,* tab. xi. fig. 7; *F. Muell. Frag.* vii. 70.—Anthericum bulbosum, *R. Br. Prodr.* 275; *Hook. Bot. Mag.* t. 3017.—A. semibarbatum, *Bot. Mag.* t. 3127, *non R. Br.*—B. Hookeri, *Kunth, Enum.* iv. 566.—B. Fraseri, *Kunth, Enum.* iv. 565.—B. australis, *Spreng. Syst. Veg.* ii. 86.—B. suavis, *Lindl. Bot. Reg.* 1838, *Misc.* p. 45. no. 78.—*Kunth, Enum.* iv. 566.—Perennis, acaulis, basi caulis vetustate tuberosa, fibris radicalibus tenuibus dense fasciculatis. Folia 12–30 dense rosulata subulata viridia glabra carnosa 9–15 poll. longa, supra basin dilatatam 1½–2 lin. crassa, dorso rotundata, facie canaliculata. Scapus 6–18-pollicaris, 1½–2 lin. crassus. Racemus 3–9 poll. longus, expansus 1½–2 poll. latus, superne densus, inferne laxus. Bracteæ lineares 3–4 lin. longæ. Pedicelli ascendentes, inferiores 6–9 lin. longi. Flores suaveolentes. Perianthium 4½–6 lin. longum aurantiacum vel citrinum, segmentis oblongis distincte viridi vittatis 1½–2 lin. latis. Filamenta 2 lin. longa, superne stupposa. Stylus declinatus 2–3 lin. longus. Capsula globosa 3–4 lin. longa breviter stipitata, seminibus in loculo 3–4. *Australia tota temperata et subtropicalis et Tasmania.*

9. B. ANNUA, *Willd. Enum.* 372; *Schult. fil. Syst.* vii. 445; *Kunth, Enum.* iv. 566.—Anthericum annuum, *Linn. Sp.* 446; *DC. Plantes, Grasses,* t. 6; *Red. Lil.* t. 397; *Bot. Mag.* t. 1451. Annua, acaulis, fibris radicalibus teneris flexuosis. Folia 12–20 rosulata subulata carnosa flaccida ascendentia facie leviter canaliculata dorso rotundata vix glaucescentia 5–8 poll. longa supra basin 1 lin. crassa. Scapi ex radice 1–4 sæpissime simplices 3–6 poll. longi teretes graciles fragiles. Racemi laxissimi 6–12-flori. Bracteæ lanceolatæ subulatæ 2–3 lin. longæ. Pedicelli diu ascendentes, inferiores 9–15 lin. longi. Perianthium flavum 3–3½ lin. longum, segmentis obtusis 1–1½ lin. latis. Filamenta perianthio subduplo breviora, alterna subbreviora, parcius barbata. Capsula globosa membranacea 1½–2 lin. longa, seminibus in loculo 3–4 nigris triquetris. *C. B. Spei.* (V. v. in Hort. Kew.)

10. B. PRÆMORSA, *Schult. fil. Syst.* vii. 446; *Kunth, Enum.* iv. 567.—Anthericum præmorsum, *Jacq. Coll. Suppl.* 15; *Icon.* t. 406. Acaulis, perennis, cormo tuberoso fuscescente oblongo præmorso prædita. Folia plura subulata disticha 1–1½-pedalia dorso rotundata facie profunde canaliculata, supra basin crassitie digiti. Scapus 1–1½-pedalis. Racemus superne densus, inferne laxus, ½–1-pedalis, expansus 18–21 lin. latus. Bracteæ lanceolatæ 1½ lin. longæ. Pedicelli patuli vel ascendentes, inferiores 6–8 lin. longi. Perianthium luteum 4 lin. longum, segmentis obtusis 1½ lin. latis. Filamenta perianthio duplo breviora, omnia stupposa. Capsulam non vidi. *C. B. Spei,* Thunberg!

11. B. PUGIONIFORMIS, *Link, Enum.* i. 327; *Schult. fil. Syst.* vii. 564; *Kunth, Enum.* iv. 564.—Anthericum pugioniforme, *Jacq. Coll. Suppl.* 83; *Ic.* t. 405; *Bot. Rep.* t. 386; *Bot. Mag.* t. 1454. Acaulis, perennis, cormo magno globoso prædita. Folia subulata rosulata glauca pedalia vel sesquipedalia crassitie digiti, facie sulcata dorso rotundata. Scapus 1–1½-pedalis teres crassitie calami. Racemus superne densus, inferne laxus, 6–12 poll. longus, expansus 15–18 poll. latus. Bracteæ lineares 2–3 lin. longæ. Pedicelli ascendentes, inferiores 6–8 lin. longi. Perianthium luteum 4 lin. longum, segmentis obtusis 1–1½ lin. latis. Filamenta perianthio duplo breviora. Capsulam non vidi. *C. B. Spei,* Burchell 6711!

12. B. BISULCATA, *Haw. Phil. Mag.* 1827, 121; *Schult. fil. Syst. Veg.* vii. 445. Acaulis, perennis, cormo tuberoso prædita. Folia pedalia subulata viridia pulposa utrinque latissime sed facie altius sulcata. Scapus foliis brevior teres erectus crassitie calami. Racemus et perianthium *B. pugioniformis. C. B. Spei* (Hort. Sweet. 1827). Non vidi.

13. B. LAXIFLORA, *Baker*. Acaulis, perennis. Folia carnosa, suberecta linearia acuminata 6–8 poll. longa supra basin 3–4 lin. lata subplana. Scapi fragiles 6–9 poll. longi. Racemi laxissimi 9–12 poll. longi expansi 2 poll. lati. Bracteæ perminutæ deltoideæ. Pedicelli centrales et inferiores patulo-arcuati 6–9 lin. longi. Perianthium luteum, maximum omnium specierum, 5–6 lin. longum, segmentis ligulatis 1–1½ lin. latis distincte viridi carinatis. Stamina 3 lin. longa, filamentis dense aurantiaco-stupposis. Stylus declinatus 4 lin. longus. *Cap. B. Spei*, Hort. Burchell, anno 1817!

14. B. ZEYHERI, *Baker*.—B. nutans, *Zeyher*, *Exsic. non Schultes*. Acaulis, perennis, cormo tuberoso parvo globoso prædita. Folia 5–6 rosulata plana linearia carnosa suberecta 5–6 poll. longa, supra basin 3–4 lin. lata, ad apicem attenuata. Scapus gracilis fragilis 3–12 poll. longus. Racemi infra apicem laxi, expansi 3–6 poll. longi, 6–8 lin. lati. Bracteæ deltoideæ scariosæ cuspidatæ 1–1½ lin. longæ. Pedicelli diu ascendentes, inferiores 5–6 lin. longi. Perianthium luteum 3–4 lin. longum, segmentis teneris ligulatis 1 lin. latis. Stamina perianthio 2–3plo breviora. Capsula oblonga 2–3 lin. longa, valvis membranaceis dorso lævibus, seminibus in loculo circiter 4 confertis triquetris. *Cap. B. Spei*, Zeyher 4219! 4224!

15. B. NARCISSIFOLIA, *Salmdyck*, *Hort. Dyck.* 334; *Kunth*, *Enum.* iv. 567. Acaulis, perennis, cormo tuberoso nullo. Folia 6–8 rosulata carnosa glauca ascendentia anguste lorata 6–12 poll. longa 3–6 lin. lata utrinque plana plus minus torta. Scapus teres 1–1½-pedalis. Racemus densus, brevis, expansus 1½–2 poll. latus. Bracteæ albidæ membranaceæ lanceolatæ 4–6 lin. longæ ante anthesin comosæ. Pedicelli ascendentes, inferiores 6–9 lin. longi. Flores suaveolentes. Perianthium luteum, segmentis oblongis viridi vittatis 1–1½ lin. latis, flore expanso reflexis. Stamina perianthio 2–3plo breviora, filamentis supra medium dense barbatis. Stylus ovarium longitudine duplo superans. Capsulam non vidi. *Cap. B. Spei*, Harvey! MacOwan 1583! (V. v. in Hort. Kew.)

16. B. DENSIFLORA, *Baker*. Acaulis, perennis, cormo tuberoso 8–9 lin. crasso prædita, collo basibus dilatatis membranaceis purpureis apice fibrosis foliorum exteriorum vestito. Folia 6–8 dense rosulata linearia plana 6–9 poll. longa supra basin 3–4 lin. lata. Scapus pedalis teres crassitie calami. Racemus brevis multiflorus densiflorus, expansus 15–18 lin. latus. Bracteæ albidæ membranaceæ longe cuspidatæ 3–4 lin. longæ infra medium late lanceolatæ ante anthesin comosæ. Pedicelli ascendentes 4–8 lin. longi, sæpe arcuati. Perianthium luteum 3 lin. longum, segmentis ligulatis 1 lin. latis. Stamina perianthio duplo breviora. Capsulam non vidi. *Cap. B. Spei ad Small deel*, Burke!

17. B. **MESEMBRYANTHEMOIDES**, *Haworth, Phil. Mag.* 1825, July 31; *Schult. fil. Syst.* vii. 448; *Kunth, Enum.* iv. 568.—Anthericum mesembryanthemoides, *Baker in Trimen's Journ.* i. 136. Acaulis perennis cormo tuberoso oblongo prædita. Folia 3–4 rosulata rotundato-spathulata carnosa viridia subaristata 4–6 lin. longa dorso rotundata facie concava. Scapus filiformis 2–3-pollicaris. Racemus laxissime 3–6-florus, expansus 1–2 poll. longus. Bracteæ perminutæ deltoideæ. Pedicelli ascendentes 3–5 lin. longi. Perianthium luteum, segmentis oblongis teneris 1 lin. latis flore expanso reflexis. Stamina subæqualia, perianthio duplo breviora, filamentis omnibus barbatis. Capsula parva globosa. *Cap. B. Spei,* Bowie, anno 1825 (vidi iconem in Bibl. Herb. Kew!). *Albany,* Bowker! *Uitenhage,* Zeyher 1068! Stirps singularis distinctissima, foliis ea *Mesembryanthemi canini* simulantibus.

18. B. **URGINEOIDES**, *Baker.* Acaulis, perennis, cormo tuberoso 1 poll. crasso fibris carnosis pluribus prædito. Folia 5–6 rosulata carnosa viridia glabra lanceolata 10–12 poll. longa, supra basin 15–18 lin. lata, ad apicem angustata. Scapus teres pedalis 3 lin. crassus. Racemus primum densus, expansus inferne laxus semipedalis, 1½ poll. latus. Bracteæ minutæ deltoideæ. Pedicelli ascendentes apice articulati, inferiores 6–8 lin. longi. Perianthium albidum 4 lin. longum, segmentis oblongis 1½ lin. latis fusco carinatis. Stamina 2½ lin. longa, filamentis omnibus superne barbatis. Stylus rectus 1½ lin. longus. *Cap. B. Spei, in ditione Namaquensi,* Rev. H. Whitehead! Flores eos *Urgineæ giganteæ* simulant.

19. B. **ALOOIDES**, *Willd. Enum.* 372; *Schult. fil. Syst.* vii. 448, 1691; *Kunth, Enum.* iv. 567.—B. acaulis, *Linn. Hort. Cliff.* 123.—Anthericum alooides, *Linn. Sp.* 446; *Dill. Elth.* t. 232. fig. 300; *DC. Plantes, Grasses,* t. 26; *Red. Lil.* t. 283; *Bot. Mag.* t. 1317. Acaulis, perennis, cormo tuberoso magno sæpe magnitudine pomi. Folia 6–12 dense rosulata carnosa viridia lanceolata 6–8 poll. longa, basi 9–12 lin. lata, ad apicem sensim angustata. Scapi plures pedales et ultra. Racemus ½–1-pedalis superne densus, expansus 1½–2 poll. latus. Bracteæ minutæ deltoideæ cuspidatæ. Pedicelli ascendentes, inferiores 5–6 lin. longæ. Perianthium 4–4½ lin. longum, segmentis oblongis, flore expanso reflexis. Filamenta citrina perianthio duplo breviora, antheris ½ lin. longis. Stylus declinatus 3 lin. longus. *Cap. B. Spei,* Hort. Kew. anno 1777! Hort. Telon. anno 1819! etc. *Africa tropicalis austro-occidentalis ad montem Chiradzura,* Dr. Meller!

20. B. **NUTANS**, *Schult. fil. Syst.* vii. 447; *Kunth, Enum.* iv. 567. —Anthericum nutans, *Jacq. Coll. Suppl.* 86; *Ic.* ii. 17, t. 407, *non Thunb.* Acaulis, perennis, radice in crura longa carnosa divisa. Folia 6–8 dense rosulata lanceolata 6–8 poll. longa supra basin 9–12

lin. lata margine albido-denticulata. Scapus pedalis, crassitie pennæ columbinæ. Racemus 6–9-pollicaris, superne densus, expansus 15 lin. latus. Bracteæ lanceolatæ 1–1½ lin. longæ. Pedicelli ascendentes 3–6 lin. longi. Perianthium inodorum 3 lin. longum, segmentis flavis oblongis. Filamenta omnia barbata, petalis paulò breviora. *Cap. B. Spei.*

21. B. LATIFOLIA, *Schult. fil. Syst.* vii. 447; *Kunth, Enum.* iv. 567.—Anthericum latifolium, *Linn. Suppl.* 202; *Thunb. Prodr.* 63; *Jacq. Coll.* ii. 249; *Ic.* ii. 17, t. 408. Perennis, cormo globoso tuberoso prædita, vetustate caulescens, caule infra rosulam foliorum 6–8 poll. longo, 1 poll. crasso. Folia 6–15 dense rosulata carnosa pallide viridia facie late concava dorso rotundata oblongo-lanceolata 6–8 poll. longa, basi 2–3 poll. lata, ad apicem angustata. Scapi plures teretes firmi 8–12 poll. longi. Racemus interdum pedalis, superne densus, expansus 18–20 lin. latus. Bracteæ lanceolatæ acuminatæ 3–4 lin. longæ ante anthesin comosæ. Pedicelli ascendentes, 6–9 lin. longi. Perianthium saturate luteum 4 lin. longum, segmentis flore expanso reflexis. Stamina perianthio subduplo breviora, filamentis omnibus barbatis. Stylus declinatus 3 lin. longus. *Cap. B. Spei*, MacOwan 1894! (V. v. in Hort. Kew.) B. MACROPHYLLA, *Salmdyck, Hort. Dyck.* 333, *Kunth, Enum.* iv. 568, ex descriptione non potui segregare.

22. B. DUBIA, *Schult. fil. Syst.* vii. 450; *Kunth, Enum.* iv. 568. Radix foliaque desunt. Scapus 1-pollicaris. Racemus laxus 14-florus 2 poll. longus. Bracteæ minutæ deltoideæ. Pedicelli fructiferi ascendentes 4–5 lin. longi. Perianthium 3½ lin. longum, segmentis albidis 1 lin. latis. Stamina perianthio ⅓ breviora, filamentis purpureis adpressis supra medium pilis purpureis glandulosis barbatis. Capsula glabra obovoideo-globosa vix ultra 1 lin. longa. *C. B. Spei*, Herb. Zuccarini. (Non vidi.)

23. B. SEMIBARBATA, *Haworth, Revis.* 33; *Schult. fil. Syst.* vii. 445; *Kunth, Enum.* iv. 565; *F. Muell. Frag.* vii. 70.—Anthericum semibarbatum, *R. Br. Prod.* 275; *Lodd. Bot. Cab.* t. 300, *non Hook. Bot. Mag.* t. 3129.—Bulbine floribunda, *Schrad.* Annua, glabra, fibris radicalibus densis gracilibus. Folia 12–20 subulata glauca rosulata 6–12 poll. longa supra basin 1–1½ lin. crassa, magis flaccida et carnosa quam in *B. bulbosa.* Scapi 1–4 pedales vel semipedales. Racemus laxe 6–50-florus, 2–9 poll. longus, expansus 1–1½ poll. latus. Bracteæ lanceolatæ 2–3 lin. longæ. Pedicelli ascendentes, apice articulati, inferiores 6–9 lin. longi, arcuati ascendentes. Flores inodori. Perianthium luteum 3–4 lin. longum, segmentis distincte vittatis 1–1½ lin. latis. Stamina perianthio duplo breviora, exteriora imberbia. Capsula globosa 2 lin. crassa, seminibus in loculo sæpe duobus superpositis. *Australia tota temperata et Tasmania.* Habitus omnino *B. annuæ*, sed facile distinguitur filamentis alternis nudis.

22. NARTHECIUM, *Moehr.*

Moehr. Ephem. Nat. Cur. 1742, 389, tab. 5. fig. 1; *Nees ab Esenb. Gen.* 4, t. 1; *Endl. Gen.* No. 1050; *Kunth, Enum.* iii. 363.—Abama, *Adans. Fam.* ii. 47; *DC. Flor. Franç.* iii. 170.—Antherici sp., *Linn.*

Perianthium 6-partitum, segmentis similibus linearibus membranaceo-herbaceis flavis dorso viridibus flore expanso patulis marcescentibus. *Stamina* 6 inclusa, filamentis hypogynis stupposis, antheris linearibus tarde versatilibus longitudinaliter dehiscentibus. *Ovarium* sessile triloculare oblongum in stylum brevem conicum angustatum, ovulis in loculo crebris plurimis, stigmate capitato. *Capsula* ovoideo-lanceolata loculicide trivalvis, seminibus plurimis minutis more *Junci* utrinque longe caudato-appendiculatis, testa straminea, embryone minuto, albumine carnoso. *Herbæ duræ persistentes paludosæ, fibris radicalibus filiformibus, foliis pluribus applanatis distichis nervosis, floribus luteis simpliciter racemosis, pedicellis inarticulatis basi bracteatis, sæpissime etiam medio bracteolatis. Ab Anthericeis omnibus reliquis seminibus facile distinguitur.*

Pedicelli medio bracteolati.
  Stamina perianthio ⅓ breviora .... 1. *N. ossifragum.*
  2. *N. asiaticum.*
  Stamina perianthio duplo breviora ...... 3. *N. californicum.*
Pedicelli medio haud bracteolati .... 4. *N. americanum.*

1. N. OSSIFRAGUM, *Huds. Angl.* 145; *Eng. Bot.* t. 535; *Hook. Fl. Lond.* t. 139; *Kunth, Enum.* iii. 363; *Maxim. Bull. Soc. Petrop.* vi. 214.—Anthericum ossifragum, *L. Sp.* 446; *Fl. Dan.* t. 42.—Abama ossifraga, *DC. Gall.* iii. 171; *Red. Lil.* t. 218.—Rhizoma reptans, fibris radicalibus filiformibus. Folia disticha ensiformia sæpe falcata 3–6 poll. longa 1½–3 lin. lata, venis distinctis haud confertis 7–8. Scapus 4–12-pollicaris foliis 3–6 reductus bracteatus. Racemus fructiferus 2–3 poll. longus subdensus, pedicellis inferioribus 6–9 lin. longis, sæpissime ad vel supra medium bracteolatis. Perianthium 3–4 lin. longum, segmentis obtusiusculis cucullatis. Stamina perianthio ⅓ breviora, filamentis summo apice nudis. Capsula cum stylo persistente perianthio sesqui longior. *Per Europam totam in uliginosis.*

2. N. ASIATICUM, *Maxim. Bull. Soc. Petrop.* vii. 214. Ad *N. ossifragum* arcte accedit. Folia 2–3 lin. lata, venis perspicuis exsculptis 9–11. Racemus fructifer subdensus 5–6 poll. longus, pedicellis infimis 5–6 lin. longis sæpissime supra medium bracteolatis. Perianthium 4 lin.

longum, segmentis subacutis. Filamenta minus stupposa, apice distincte nuda. Capsula cum stylo perianthio sesqui longior. *Japonia in Troppon boreali*, Maximowicz!

3. N. CALIFORNICUM, *Baker.*—N. ossifragum, var. occidentale, *A. Gray in Boland. Pl. Calif.* 15 (*nomen*). Ad *N. ossifragum* arcte accedit. Folia 1½–2 lin. lata distincte 7–9-nervata. Racemus 2–3 poll. longus, deorsum laxus, pedicellis inferioribus 3–4 lin. longis, medio sæpissime bracteolatis. Perianthium 4 lin. longum, segmentis acutiusculis. Stamina perianthio subduplo breviora, filamentis ad apicem dense stupposis. Capsulam non vidi. *California*, Bolander 6548!

4. N. AMERICANUM, *Gawl. Bot. Mag.* t. 1505; *Schult. fil. Syst.* vii. 279; *Kunth, Enum.* iii. 363.—N. ossifragum, var. americanum, *A. Gray, Man.* edit. 5, 535. Ad *N. ossifragum* arcte accedit. Folia longiora angustiora 1–1½ lin. lata firmiora venis perspicuis crebris 9–11. Racemus fructifer 1–2 poll. longus densus, pedicellis ebracteolatis, infimis 3–4 lin. longis. Perianthium 3 lin. longum, segmentis obtusis. Stamina perianthio vix breviora, filamentis dense stupposis summo apice nudis. Capsula cum stylo persistente perianthio duplo longior. *America borealis ab Canada ad Novam Cæsaream.*

23. SIONA, *Salisb.*

Salisb. Gen. 67, 69.—Arthropodii species dubia, *R. Br. Prod.* 276.

"Petala interiora fimbriata. Filamenta apice crassiora et stuposa, quibus a sequente (*Arthropodium*) dignoscitur. Antheræ longæ. Semina non arillata. Flores in spica simplici."—*Salisb. loc. cit.*

Ex descriptione medium inter *Arthropodium* et *Thysanotum* tenet.

1. S. FIMBRIATA, *Salisb. loc. cit.*—Arthropodium fimbriatum, *R. Br. loc. cit.*—"Racemo simplici, pedicellis inferioribus geminis, filamentis inferne imberbibus, apice strumoso, antheris linearibus, foliolis perianthii interioribus fimbriatis. Ab [*Arthropodiis*] reliquis structura staminum maxime differt; an proprii generis?"—*R. Br. loc. cit.* *Australia temperata orientalis* e D. est in herbario Brownii.

24. ARTHROPODIUM, *R. Br.*

R. Br. Prodr. 276 *ex parte*; *Endl. Gen.* no. 1146; *Kunth, Enum.* iv. 617.—Antherici et Phalangii sp. *auct.*

Perianthium marcescens 6-partitum album vel purpureum, segmentis oblongis subsimilibus nudis flore expanso patulis dorso laxe trinervatis, interioribus latioribus margine crispatis. *Stamina* 6 inclusa, filamentis hypogynis dense barbatis (barba in *cirrhato* 2-caudata) basi nudis, antheris minutis lineari-oblongis basifixis. *Ovarium* globosum sessile triloculare, ovulis in loculo paucis vel pluribus superpositis; stylus filiformis declinatus, stigmate capitato. *Capsula* membranacea globosa loculicide trivalvis, seminibus in loculo 4–12 parvis turgidis nigris opacis. *Habitus omnino Antherici.*

Subgenus EUARTHROPODIUM. Barba filamentorum in caudas haud producta.

Perianthium candidum .... 1. *A. candidum.*
2. *A. neo-caledonicum.*

Perianthium purpureum.
Pedicelli inferiores 2–4ni .... 3. *A. paniculatum.*
4. *A. pendulum.*
Pedicelli omnes solitarii .... 5. *A. minus.*
6. *A. Preissii.*

Subgenus DICHOPOGON. Barba filamentorum in caudas duas producta.

Species sola................................ 7. *A. cirrhatum.*

1. A. CANDIDUM, *Raoul, Choix*, 14, t. 6; *Hook. fil. Flor. New Zeal.* i. 254; *Handb.* 285. Fibræ radicales graciles, collo radicis haud setoso. Folia plura glabra anguste linearia graminoidea membranacea 3–9 poll. longa 1–1½ lin. lata, venis tenuibus 6–8. Scapi teretes gracillimi 1–6 poll. longi. Racemi laxissimi simplices vel furcati 4–6 poll. longi, internodiis inferioribus 1–2 poll. longis. Bracteæ lineares foliaceæ, inferiores 12–18 lin. longæ. Pedicelli gracillimi medio articulati patuli vel cernui, inferiores 2–3ni 6–12 lin. longi. Perianthium album 1½–2 lin. longum, segmentis lanceolatis dorso trinervatis. Filamenta 1 lin. longa dense stupposa, antheris ¼ lin. longis. Capsula globosa 1 lin. longa obtusa trigona, seminibus in loculo 2–3. *Nova Zelandia in sylvis montosis*, Colenso! Haast! etc.

2. A. NEO-CALEDONICUM, *Baker.* Folia plura anguste linearia graminoidea acuminata 4–5 poll. longa 1–1½ lin. lata, venis tenuibus immersis. Scapus teres gracilis semipedalis bracteatus. Racemi laxe paniculati ascendentes laxissimi 3–6 poll. longi, internodiis inferioribus 1–1¼ poll. longis. Bracteæ minutæ deltoideæ. Pedicelli medio articulati patuli vel cernui, inferiores gemini 4–6 lin. longi. Perianthium album 3 lin. longum, segmentis lanceolatis 1 lin. latis dorso trinervatis. Filamenta 1½ lin. longa dense stupposa, antheris oblongis ½ lin. longis. *Nova Caledonia ad Kanala*, Deplanche! Vieillard 1395!

3. A. PANICULATUM, *R. Br. Prodr.* 276 *ex parte*; *Bot. Mag.* t. 1421; *Endl. Ic.* t. 28.—Anthericum paniculatum, *Andr. Bot. Rep.* t. 395.—Phalangium paniculatum, *Poir. Ency. Suppl.* iv. 383.—Anthericum

milleflorum, *Red. Lil.* t. 58.—Arthropodium minus, *Lindl. Bot. Reg.* t. 866, *non R. Br.*—A. Lindleyi, *Kunth, Enum.* iv. 621.—A. capillipes, *Endl. Pl. Preiss.* ii. 34; *Walp. Ann.* i. 869. Fibræ radicales cylindricæ carnosæ deorsum nodulosæ, collo radicis haud setoso. Folia plurima anguste linearia graminoidea glabra 6–9 poll. longa 1–1½ lin. lata, venis tenuibus immersis. Scapus gracilis teres ½–1-pedalis folio unico reducto interdum bracteato. Racemi laxissimi simplices vel parce paniculati, centrales 6-9 poll. longi, 1½–2 poll. lati. Bracteæ minutæ lanceolatæ. Pedicelli gracillimi patentes apice cernui sub apice articulati, inferiores 2–3ni 9–12 lin. longi. Perianthium purpureum 2½–3 lin. longum, segmentis dorso trinervatis, exterioribus lanceolatis, interioribus latioribus margine crispatis. Filamenta 1½ lin. longa, dense flavo-stupposa, basi nuda, antheris oblongis ½ lin. longis purpureis vel flavis. Capsula globosa membranacea 1½–2 lin. longa, seminibus in loculo 4–6. *Tasmania et Australia temperata orientalis et occidentalis.*

4. A. PENDULUM, *DC. Cat. Hort. Monsp.* 80; *Schult. fil. Syst.* vii. 440; *Kunth, Enum.* iv. 620.—Phalangium pendulum, *Delaroche in Red. Lil.* t. 360.—Anthericum pendulum, *Hornem. Hort. Hafn.* 4; *Willd. Enum.* 371.—Arthropodium paniculatum, *R. Br. herb.! et F. Muell. Frag.* vii. 66 *ex parte.* Fibræ radicales deorsum nodulosæ, collo radicis haud setoso. Folia omnino *A. paniculati.* Scapus ½–1-pedalis, nudus vel folio unico reducto bracteatus. Racemi paniculati laxissimi 3–6 poll. longi, bracteis minutis lanceolatis, pedicellis cernuis medio articulatis 3–6 lin. longis inferioribus 2–4nis. Perianthium purpureum 3–4 lin. longum, segmentis subsimilibus. Stamina et capsula *A. paniculati. Tasmania et Australia temperata orientalis.*

5. A. MINUS, *R. Br. Prod.* 276; *Schult. fil. Syst.* vii. 441; *Kunth, Enum.* iv. 621, *non Lindl. Bot. Reg.* t. 866.—Dichopogon humilis *F. Muell. Frag.* vii. 67, *non Kunth.* Fibræ radicales deorsum nodulosæ, collo radicis haud setoso. Folia plura anguste linearia graminoidea glabra 3–6 poll. longa, 1–2 lin. lata. Scapus simplex ebracteatus 3–6 poll. longus. Racemi simplices vel parce paniculati secundi 2–4 poll. longi, internodiis inferioribus 6–12 lin. longis. Bracteæ lanceolatæ 3–6 lin. longæ. Pedicelli inferiores cernui solitarii 4–6 lin. longi, sub apice articulati. Perianthium purpureum 2–2½ lin. longum, segmentis subsimilibus oblongo-lanceolatis. Stamina perianthio ⅓ breviora, filamentis dense flavo-stupposis, antheris minutis purpureis. Capsula globosa membranacea 2 lin. crassa, seminibus in loculo 4–6. *Tasmania et Australia temperata orientalis.*

6. A. PREISSII, *Endl. Pl. Preiss.* ii. 35; *Walp. Ann.* i. 869; *F. Muell. Frag.* vii. 66. Folia rigidula semipedalia glabra ½–1 lin. lata facie canaliculata. Scapus gracilis nudus ebracteatus semipedalis. Ra-

cemi laxissimi secundi simplices vel furcati 3–4 poll. longi, internodiis inferioribus 1–1½ poll. longis. Bracteæ minutæ lineares. Pedicelli omnes solitarii deflexi 6–9 lin. longi sub apice articulati. Perianthium *A. penduli*. *Australia occidentalis ad Perth,* Preiss 1567 !

7. A. CIRRHATUM, *R. Br. Bot. Mag.* t. 2350 ; *Bot. Reg.* t. 709 ; *Kunth, Enum.* iv. 622 ; *Hook. fil. Flor. New Zeal.* i. 254 ; *Handb.* 285 ; *Fisch. et Lall. Ind. Sem. Petrop.* 1845, 52.—Anthericum cirratum, *Forst. Prodr.* no. 148. Fibræ radicales carnosæ cylindricæ, collo radicis dense fibroso. Folia plura membranacea oblanceolata glabra 1½–2-pedalia 1½–2 poll. lata, ad basin angustata. Scapus teres validus ebracteatus 1–1½-pedalis. Panicula laxa deltoidea ½–1-pedalis, ramis racemosis ascendentibus, primariis foliis magnis reductis bracteatis. Bracteæ lanceolatæ purpurascentes 3–6 lin. longæ. Pedicelli medio articulati, inferiores 2–3ni patuli vel cernui 6–8 lin. longi. Perianthium candidum 6–8 lin. longum, segmentis oblongis medio 3–4 lin. latis dorso laxe trinervatis. Filamenta 3–4 lin. longa, superne dense barbata, barba sursum alba deorsum flava in caudam utrinque producta, antheris oblongis ½ lin. longis. Ovula in loculo 12–16. Capsula globosa 4 lin. longa, seminibus nigris lateraliter compressis. *Nova Zealandia,* Forster ! Banks & Solander ! Dr. Hooker ! etc. A. APPENDICULATUM, *Lall. Ind. Sem. Petrop.* 1845, 52, ab *cirrhato* dicitur recedere foliis e basi ad apicem canaliculatis, perianthii segmentis interioribus distincte crenulatis, staminibus pistillo distincte brevioribus et foliis angustioribus (10–13 lin. latis) prope basin vix angustatis.

25. MORGAGNIA, *Bubani.*

Bubani, Sched. Crit. 6 (1842) ; *Parl. Fl. Ital.* ii. 605.—Simethis, *Kunth, Enum.* iv. 618 (1843).—Antherici sp., *Linn.*—Phalangii sp., *Pers.*

Perianthium 6-partitum corollinum purpureum caducum, segmentis oblongo-lanceolatis subsimilibus flore expanso patulis dorso laxe 5-nervatis. *Stamina* 6 inclusa subhypogyna, filamentis filiformibus medio barbatis, antheris oblongis versatilibus. *Ovarium* sessile globosum triloculare, ovulis in loculo 2 superpositis ; stylus rectus filiformis, stigmate capitato. *Capsula* parva globosa membranacea obtuse lobata loculicide trivalvis, seminibus turgidis basi arillo albo præditis, testa crustacea nitide nigra, albumine copioso.

1. M. BICOLOR, *Bubani et Parl. loc. cit.*—Simethis bicolor, *Kunth, Enum.* iv. 638 ; *Eng. Bot.* edit. 3, t. 1541.—Anthericum bicolor, *Desf. Atl.* i. 304, t. 90.—A. planifolium, *Vandelli in Linn. Mant.* 224.—Phalangium planifolium, *Pers. Syn.* i. 367.—P. bicolor, *DC. in*

Red. Lil. t. 215. Fibræ radicales fasciculatæ cylindrico-carnosæ magnæ, collo radicis sæpe setoso. Folia 6–9 anguste linearia glabra graminoidea 1–1½-pedalia, 2–3 lin. lata. Scapus nudus gracilis 9–18-pollicaris. Flores 20–30 in corymbum laxum dispositi, pedicellis apice articulatis ascendentibus, exterioribus 6–12 lin. longis. Bracteæ minutæ lineares vel lanceolatæ membranaceæ. Perianthium 4–6 lin. longum, extus purpurascens, intus pallidius, segmentis 1–1½ lin. latis. Capsula globosa 2 lin. longa, seminibus nigris lucidis. *Ab Anglia meridionali ad Lusitaniam, Mauritaniam et Italiam.*

26. STYPANDRA, *R. Br.*

R. Br. Prod. 278; *Schult. Syst.* vii. 33, 433; *Endl. Gen.* no. 1149; *Kunth, Enum.* iv. 624.—Styponema, *Salisb. Gen.* 67.

Perianthium cæruleum 6-partitum, segmentis oblongis flore expanso patentibus exterioribus ante anthesin subvalvatis firmioribus dorso viridibus laxe nervatis, 3 interioribus teneris, exterioribus obtusioribus nervis in carinam concretis. *Stamina* 6 profunde perigyna inclusa, filamentis perianthio 3–4plo brevioribus flavo-stupposis vel muricatis, basi nudis, antheris parvis linearibus basifixis vetustate contortis. *Ovarium* triloculare sessile, ovulis in loculo paucis; stylus filiformis antheras paulo superans; stigma punctiforme. *Capsula* obovoidea coriacea, dimidio superiore loculicide trivalvis, seminibus in loculo paucis oblongis parvis turgidis exarillatis, testa nigra nitida crustacea, albumine copioso. *Herbæ australienses, foliis linearibus graminoideis, floribus copiose corymbosis, pedicellis inarticulatis.*

Subgenus EUSTYPANDRA. Scapus nudus vel folio unico parvo bracteatus. Filamenta filiformia papilloso-muricata.
1. *S. cæspitosa.* 2. *S. umbellata.*

Subgenus STYPONEMA. Caulis distiche foliatus. Filamenta clavata dense stupposa.
Species sola .... 3. *S. glauca.*

1. S. CÆSPITOSA, *R. Br. Prodr.* 279; *Schult. fil. Syst.* vii. 433; *Kunth, Enum.* iv. 226; *Chars. Wild Flow.* tab. 5. fig. 4; *F. Muell. Frag.* vii. 65. Herba glabra 2–3-pedalis, rhizomate reptante, rosulis foliorum dense cæspitosis. Folia linearia dura acuminata 1–1½-pedalia 2–4 lin. lata venis crebris exsculptis. Scapus ½–1-pedalis nudus vel folio unico reducto ebracteatus. Panicula laxissima corymbosa 6–12 poll. longa et lata obverse deltoidea, pedicellis semper

erectis 6–18 lin. longis ebracteolatis. Perianthium 5–6 lin. longum cæruleum vel interdum albidum, segmentis oblongis laxe nervatis. Filamenta filiformia 1½–2 lin. longa flavo-papillosa muricata, antheris ½ lin. longis. Capsula obovoideo-clavata 4 lin. longa coriacea, seminibus in loculo 2–4 turgidis lenticularibus. *Tasmania et Australia temperata orientalis.*

2. S. UMBELLATA, *R. Br. Prodr.* 279; *Schult. fil. Syst.* vii. 334; *Kunth, Enum.* iv. 626; *Chars.* tab. 5. fig. 5.—S. cæspitosa, var. umbellata, *F. Muell. Frag.* vii. 65. Ad *S. cæspitosam* arcte accedit. Minor, semipedalis vel pedalis. Folia rigida erecta anguste linearia 6–9 poll. longa 1–1½ lin. lata. Scapus semipedalis nudus vel folio unico bracteatus. Corymbi basi 6–10-flori, pedicellis ascendentibus 6–18 lin. longis. Perianthium 4½–5 lin. longum, intus ochroleucum. Genitalia flava. Filamenta 1½–2 lin. longa papilloso-muricata. *Tasmania et Australia temperata orientalis.*

Var. FRASERI, *Baker.* Folia angustissima 5-nervata ¼ lin. lata. Perianthium 2 lin. longum, segmentis acutis. *Australia occidentalis ad sinum Regis Georgii,* Fraser!

3. S. GLAUCA, *R. Br. Prod.* 279; *Schult. fil. Syst.* vii. 433; *Kunth, Enum.* iv. 625; *F. Muell. Frag.* vii. 64.—Arthropodium glaucum, *Spreng. Syst.* ii. 87.—S. imbricata, *R. Br. Prod.* 279; *Kunth, Enum.* iv. 625.—S. frutescens, *Knowles & West, Flor. Cab.* ii. 61; *Kunth, Enum.* iv. 626.—S. scoparia, *Endl. Pl. Preiss.* ii. 35. Suffruticosa erecta glabra ramosa, caulibus ad basin inflorescentiæ foliatis. Folia linearia glabra 3–6 poll. longa glauca disticha caulem longe amplectentia 3–4 lin. lata, venis crebris tenuibus exsculptis. Flores 12–20 laxe corymboso-paniculati, pedicellis nudis ascendentibus apice cernuis 6–12 lin. longis. Perianthium 5–6 lin. longum, segmentis 1½–2½ lin. latis dorso laxe 5-nervatis. Filamenta 1 lin. longa dense flavo-stupposa, antheris flavis ½ lin. longis. Capsula obovoidea 4–5 lin. longa. Ovula in loculo 6–8. *Australia temperata orientalis et occidentalis.*

Var. S. PROPINQUA, *A. Cunn. in Bot. Mag.* t. 3417; *Kunth, Enum.* iv. 625.—S. virgata, *Endl. Pl. Preiss.* ii. 35, ab typo recedit habitu graciliore, foliis angustioribus magis acuminatis, floribus minoribus.

Var. S. GRANDIFLORA, *Lindl. Swan River,* 57; *Kunth, Enum.* iv. 625, ab typo recedit foliis paucioribus angustioribus, pedicellis elongatis, floribus majoribus, perianthii segmentis 7–8 lin. longis magis acuminatis. *Ad flumen Cygni,* Drummond! etc.

Species exclusæ.

S. coarctata, *R. Br.*	=Eccremis coarctata.
S. scabra, *R. Br.*	=Cæsia (Agrostocrinum) scabra.

27. Cæsia, *R. Br.*

R. Brown, Prodr. 277 ; *Endlich. Gen.* No. 1151 ; *Kunth, Enum.* iv. 608 (*excl. sp. African.*).—Agrostocrinum, *F. Muell. Frag.* ii. 95.

Perianthium corollinum 6-partitum sæpissime cæruleum, segmentis conformibus oblanceolatis vel oblongis obtusis dorso sæpe laxe nervatis post anthesin sæpissime spiraliter contortis. *Stamina* 6 hypogyna vel profunde perigyna, filamentis filiformibus, antheris oblongis versatilibus. *Ovarium* triloculare, ovulis in loculo geminis vel paucis ; stylus filiformis, stigmate minuto capitato. *Capsula* membranacea, latior quam longa, indehiscens vel tarde trivalvis sæpissime profunde trilobata, seminibus in loculo 1–2 vel paucis, turgidis vel discoideis, testa nigra obscura membranacea, albumine copioso. *Herbæ habitu* Antherici, *foliis anguste linearibus graminoideis, in speciebus suffruticosis evanescentibus.*

Series 1. *Ovula in loculo gemina erecta. Capsula obtuse trilobata, seminibus in loculo globosis sæpissime solitariis. Perianthii segmenta post anthesin spiraliter contorta.*

1. Eucæsia. Herbæ, foliis graminoideis, floribus copiose racemoso-paniculatis, capsulis trilocularibus.

Collum radicis haud setiferum.
Perianthium cæruleum .... 1. *C. vittata.*
2. *C. parviflora.* 3. *C. occidentalis.*
Perianthium viridulum..... .... 4. *C. chlorantha.*
Collum radicis dense setosum .... 5. *C. setifera.*
6. *C. spiralis.*

2. Agrostocrinum. Herba, foliis duris anguste linearibus, caule ancipiti foliato, floribus paucis corymbosis, capsulis trilocularibus apice tricuspidatis.

Species sola .... 7. *C. scabra.*

3. Corynotheca (*F. Muell. Frag.* vii. 68). Suffrutices vel herbæ duræ ramosissimæ, foliis subnullis, floribus minutis laxe racemosis, capsulis abortione sæpissime unilocularibus monospermis.

Ramificatio 2–3chotoma .... 8. *C. lateriflora.*
9. *C. dichotoma.*
Ramificatio pinnata........................... 10. *C. acanthoclada.*

Series 2. *Ovula in loculo pauca superposita. Capsula acute angulata, seminibus subdiscoideis. Perianthii segmenta post anthesin haud contorta.*

4. CHAMÆSCILLA (*F. Muell. Frag.* vii. 68). Inflorescentia laxe corymbosa. Stylus inclusus. *Australienses.*
11. *C. corymbosa.* 12. *C. paradoxa.*

5. ORTHOCÆSIA. Inflorescentia dense subspicata. Stylus longe exsertus.
Species sola.................................... 13. *C. africana.*

1. C. VITTATA, *R. Br. Prod.* 277; *Schult. fil. Syst.* vii. 455; *Kunth, Enum.* iv. 608; *Hook. fil. Fl. Tasm.* ii. 53; *F. Muell. Frag.* vii. 68.—C. cyanea, *A. Cunn.* Fibræ radicales dense fasciculatæ deorsum cylindrico-carnosæ, collo radicis haud setoso. Folia plura anguste linearia glabra graminoidea 4–9 poll. longa, 3–6 lin. lata acuminata, venis immersis. Scapus infra inflorescentiam brevis. Panicula laxissima 1–2-pedalis, ramis pluribus flexuosis ascendentibus, racemis sublaxis 3–6 poll. longis. Bracteæ lanceolatæ 1–3 lin. longæ, margine scariosæ. Pedicelli ascendentes graciles sub apice articulati, inferiores 3–6ni, 3–6 lin. longi. Perianthium cæruleum 2½–3 lin. longum, segmentis oblanceolatis obtusis dorso crebre trinervatis post anthesin spiraliter contortis ¾–1 lin. latis. Filamenta glabra cærulea perianthio duplo breviora, antheris luteis ½ lin. longis. Capsula globosa 1½–2 lin. lata profunde trilobata, lobis obtusis, seminibus in loculo 1–2 nigris globosis basi arillo magno albo præditis. *Tasmania et Australia temperata orientalis.*

2. C. PARVIFLORA, *R. Br. Prodr.* 277; *Kunth, Enum.* iv. 609; *Hook. fil. Fl. Tasm.* ii. 53; *F. Muell. Frag.* vii. 67. Ad *C. vittatam* arcte accedit, sed minor, foliis angustioribus. Fibræ radicales graciles. Folia anguste linearia glabra graminoidea 3–6 poll. longa 1–1½ lin. lata. Racemi sæpissime simplices laxi 2–5 poll. longi. Perianthium cæruleum 2–2½ lin. longum, segmentis post anthesin contortis. Capsula 1 lin. longa profunde trilobata, seminibus in loculo solitariis globosis arillatis. *Tasmania et Australia temperata orientalis.*

3. C. OCCIDENTALIS, *R. Br. Prod.* 277; *Kunth, Enum.* iv. 609; *Endl. Pl. Preiss.* ii. 33.—C. micrantha, *Lindl. Swan River,* 57; *Kunth, Enum.* iv. 609; *Endl. Pl. Preiss.* ii. 34. Ad *C. vittatam* arcte accedit. Fibræ radicales graciles, collo radicis haud setoso. Folia anguste linearia glabra graminoidea 6–12 poll. longa 1–1½ lin. lata. Racemi sæpissime plures, 3–6 poll. longi, superne subdensi. Bracteæ minutæ deltoideæ. Pedicelli ascendentes gracillimi apice articulati, inferiores 3–4ni 3–4 lin. longi. Perianthium cæruleum 2–2½ lin.

longum, segmentis oblanceolatis post anthesin contortis. Capsula 1 lin. longa profunde trilobata, seminibus solitariis globosis alboarillatis. *Australia temperata australis et occidentalis.*

4. C. CHLORANTHA, *F. Muell. Frag.* i. 63. Habitus omnino *C. vittatæ.* Collum radicis haud setosum. Folia anguste linearia glabra 1–1½-pedalia, 3–4 lin. lata, venis immersis. Panicula ½–1-pedalis ramis paucis distantibus basi foliis 2–4 poll. longis bracteatis, racemis laxis 2–6 poll. longis. Bracteæ superiores minutæ deltoideæ, inferiores lanceolatæ. Pedicelli apice articulati, inferiores 3–4ni 3–4 lin. longi. Perianthium viridulum 2½–3 lin. longum, segmentis post anthesin spiraliter contortis. Filamenta glabra perianthio duplo breviora, antheris minutis oblongis. Capsula *C. vittatæ. In planitiebus basalticis Australiæ tropicæ,* F. Mueller!

5. C. SETIFERA, *Baker.* Fibræ radicales dense fasciculatæ copiose cylindrico-incrassatæ, collo radicis dense fibroso. Habitus omnino *C. vittatæ.* Folia anguste linearia graminoidea semipedalia ½–1 lin. lata. Scapus gracilis 4–8-pollicaris. Racemi laxi parce paniculati 2–3 poll. longi. Bracteæ minutæ deltoideæ. Pedicelli apice articulati, inferiores 2–3ni 2–3 lin. longi. Perianthium cæruleum 2–2½ lin. longum, segmentis post anthesin contortis. *Australia borealis ad Port Darwin,* Schultz! (Schomburgk 638!).

6. C. SPIRALIS, *Endl. Pl. Preiss.* ii. 34; *F. Muell. Frag.* vii. 68. Fibræ radicales graciles, collo radicis densissime fibroso. Folia subcoriacea glabra plana anguste linearia 3–4 poll. longa, 1 lin. lata. Scapus gracilis teres ebracteatus 6–9-pollicaris. Panicula subcorymbosa 12–20-flora, ramis paucis ascendentibus. Bracteæ perminutæ deltoideæ. Pedicelli ascendentes 2–6 lin. longi apice articulati. Perianthium 3 lin. longum cæruleum, segmentis post anthesin spiraliter contortis. Capsula obovoidea 3 lin. longa ab apice profunde trilobata. *Australia occidentalis,* Drummond! Preiss 1543!

7. C. SCABRA, *Baker.*—Stypandra scabra, *R. Br. Prod.* 279; *Kunth, Enum.* iv. 626.—Agrostocrinum stypandroides, *F. Muell. Frag.* ii. 95. Arthropodium scabrum, *Spreng. Syst.* ii. 87.—Cæsia hirsuta, *Lindl. Swan River,* 57; *Kunth, Enum.* iv. 609. Herba dura glabra 1–3-pedalis. Fibræ radicales graciles, collo radicis haud setoso. Folia anguste linearia rigida basin scapi amplectentia, basalia 6–18 poll. longa 1–3 lin. lata, venis crebris distinctis. Caulis anceps foliis pluribus similibus brevioribus bracteatus. Inflorescentia 6–20-flora laxe corymbosa, pedicellis ascendentibus 1–1½ poll. longis conspicue glanduloso-setosis apice articulatis, basi bracteis minutis linearibus suffultis. Perianthium cæruleum 6–7 lin. longum extus glandulosum, segmentis membranaceis oblongis dorso laxe distincte 5-nervatis 2–3 lin. latis, basi in cupulam concretis. Stamina perianthio duplo breviora,

antheris cæruleis 1½ lin. longis. Capsula globosa indehiscens 3 lin. crassa, apice tricuspidata, seminibus geminis turgidis exarillatis. *Australis temperata occidentalis,* R. Brown! Drummond 776! Preiss 1538! etc.

8. C. LATERIFLORA, *R. Br. Prodr.* 277; *Kunth, Enum.* iv. 609; *F. Muell. Frag.* vii. 61. Suffrutex ramosissimus 2–3-pedalis, ramis virgatis interdum humifusis, ramulis copiosis gracillimis rectis ascendentibus vel patulis 3–9 poll. longis. Folia basalia filiformia glabra 4–6 poll. longa. Racemi laxissimi 3–6 poll. longi. Bracteæ minutæ deltoideæ. Pedicelli cernui ½–1 lin. longi, inferiores 2–4ni. Perianthium viridulum 2–3 lin. longum, segmentis post anthesin contortis. Capsula sæpe abortu unilocularis clavata monosperma 1½ lin. longa, semine globoso exarillato. *Australis tropicalis et temperata.*

9. C. DICHOTOMA, *F. Muell. Frag.* i. 215.—Thysanotus micranthus, *Endl. Pl. Preiss.* ii. 36.—Asparagus micranthus, *Lindl. Swan River,* 58; *Kunth, Enum.* v. 73. Herba ramosissima erecta, ramis gracillimis duris glabris teretibus copiose dichotome furcatis, ramulis brevibus 1–3 poll. longis sæpissime erecto-patentibus. Racemi pauciflori laxissimi, bracteis minutis deltoideis, pedicellis cernuis 1–1½ lin. longis apice articulatis 1–3nis, perianthio viridulo clavato 1½ lin. longo, coccis clavatis sæpissime solitariis. *Australia occidentalis ad flumen Cygni,* Preiss 1566! 1576! Fraser! Drummond!

10. C. ACANTHOCLADA, *F. Muell. Fragm.* i. 215. Suffrutex parvus durus ramosus, ramis ultimis patulis paniculatis simplicibus vel furcatis 6–12 lin. longis apice pungentibus. Flores ad ramulos sparsi pauci, pedicellis brevissimis cernuis 1–3nis apice articulatis, bracteis minutis deltoideis, perianthio albido 1 lin. longo post anthesin spiraliter contorto, coccis minutis clavatis monospermis sæpissime solitariis. *Australia occidentalis ad flumen Murchison,* Oldfield!

11. C. CORYMBOSA, *R. Br. Prodr.* 277; *Kunth, Enum.* iv. 609; *Hook. fil. Fl. Tasm.* ii. 52, t. 132; *F. Muell. Frag.* vii. 68; *Charsl. Wild Flowers,* tab. 11. fig. 4.—C. versicolor, *Endl. Preiss.* ii. 34, *non Lindl.* Fibræ radicales fasciculatæ carnosæ cylindricæ, collo radicis dense fibroso. Folia plura anguste linearia graminoidea 4–6 poll. longa, 2–3 lin. lata, obscure ciliata, venis 10–12 tenuibus immersis. Scapus 3–6-pollicaris teres gracilis ebracteatus. Inflorescentia corymbosa 10–20-flora, ramis distantibus ascendentibus. Bracteæ minutæ deltoideæ vel lanceolatæ. Pedicelli inarticulati ascendentes stricti 1–9 lin. longi sæpe bracteolati. Perianthium cæruleum interdum albidum 4–5 lin. longum, segmentis obtusis 1½ lin. latis dorso laxe trinervatis post anthesin haud contortis. Ovula in loculo 12–15. Capsula obcuneata 4 lin. longa et lata profunde trilobata, seminibus 3–6 subdiscoideis exarillatis. *Tasmania et Australia temperata orientalis et occidentalis.*

Var. C. VERSICOLOR, *Lindl. Swan River*, 57 ; *Kunth, Enum.* iv. 609. Robustior, pedalis vel sesquipedalis, foliis 5–6 lin. latis, corymbis 20–40-floris, perianthio 5–6 lin. longo. *Ad flumen Cygni*, Drummond !

12. C. PARADOXA, *Endl. Pl. Preiss.* ii. 34. Fibræ radicales cylindricæ 3–4 lin. longæ, collo radicis parce setoso. Folia pollicaria glabra plana angustissima ¼ lin. lata. Scapus gracillimus 2–3-pollicaris, 1–4-florus. Bracteæ perminutæ lineares. Perianthium 2–2½ lin. longum cyaneum, segmentis oblongo-lanceolatis. Stamina perianthio duplo breviora. *Australia occidentalis ad Perth*, Preiss 1544 !

13. C. AFRICANA, *Baker, Linn. Trans.* xxix. 160, tab. 103A. Fibræ radicales cylindricæ carnosæ, collo radicis dense fibroso. Folia 3–4 basin scapi amplectentia lorata membranacea glabra 10–15 poll. longa medio 6–9 lin. lata margine ciliata ad basin longe attenuata, venis perspicuis 20–30. Scapi nudi ebracteati 4–6 poll. longi. Racemi densissimi subspicati sæpe simplices 2–5 poll. longi, expansi 8–9 lin. lati. Bracteæ membranaceæ subulatæ 3–6 lin. longæ. Pedicelli subnulli brevissimi. Perianthium viridulum, expansum flavum 2–2½ lin. longum, segmentis dorso rubello carinatis post anthesin haud contortis. Stamina subexserta, filamentis filiformibus. Capsula depresso-globosa 2 lin. lata profunde acute trilobata et emarginata, seminibus in loculo 1–2 discoideis. *Africa æquinoctialis*, lat. 5° 50′ S., long. 33° E. *alt.* 4000 *pedes*, Col. Grant ! *In ditione fluminis Zambesi ad Shupanga*, Dr. Kirk !

28. TRICORYNE, *R. Br.*

R. Brown, Prodr. 278 ; *Bauer, Ill.* t. 11 ; *Endl. Gen.* no. 1153 ; *Kunth, Enum.* iv. 612.

Perianthium 6-partitum corollinum flavum, segmentis similibus teneris dorso carinatis crebre nervatis post anthesin spiraliter contortis. *Stamina* 6 obscure perigyna, perianthio triplo breviora, filamentis rectis filiformibus superne stupposis, inferne nudis, antheris oblongis versatilibus. *Ovarium* profunde tripartitum triloculare, ovulis in loculo geminis erectis ; stylus filiformis ; stigma punctiforme. *Cocci* 3 vel sæpe 1–2 abortivi monospermi indehiscentes, seminibus solitariis turgidis, testa crustacea nigra, albumine copioso. *Herbæ duræ, foliis graminoideis caulibus bracteatis sæpissime copiose dichotome furcatis, floribus parvis coloratis post anthesin contortis umbellatis, umbellis ad apices ramorum dispositis, pedicellis apice articulatis singulis basi bracteatis. Genus Australiense endemicum ab* Anthericeis *reliquis habitu facile distinguendum.*

Caulis angulatus simplex vel furcatus .... 1. *T. simplex.*
Caules haud alati copiose dichotome furcati.
 Rami basi foliis herbaceis 1–2 poll. longis bracteati.
 2. *T. elatior.* 3. *T. humilis.*
 Rami basi bracteis minutis membranaceis præditi.
 4. *T. tenella.* 5. *T. muricata.*
Caules distincte alati dichotome furcati.
 6. *T. anceps.* 7. *T. pterocaulon.*

1. T. SIMPLEX, *R. Br. Prod.* 278; *Schult. fil. Syst.* vii. 452; *Kunth, Enum.* iv. 612. Glabra, dense cæspitosa, semipedalis vel pedalis. Folia radicalia anguste linearia graminoidea 6–8 poll. longa, 1–1½ lin. lata, venis tenuibus immersis. Caulis simplex raro furcatus gracilis angulatus foliis 2–3 magnis bracteatis. Flores 10–20 in umbellam terminalem dispositi, pedicellis 3–6 lin. longis filiformibus apice articulatis, singulis bractea minuta lanceolata præditis. Perianthium flavum 3 lin. longum, segmentis in carinam crebre trinervatis. Filamenta 1 lin. longa, superne dense flavo-stupposa, antheris oblongis ½ lin. longis. Cocci 1–3 clavati 1½ lin. longi. *Australia temperata orientalis et occidentalis.*

2. T. ELATIOR, *R. Br. Prod.* 278; *Schult. fil. Syst.* vii. 452; *Bauer, Ill.* t. 11; *Endl. Icon.* t. 61; *Kunth, Enum.* iv. 612; *Endl. Pl. Preiss.* ii. 35; *Hook. Fl. Tasm.* ii. 55. Glabra, 2–3-pedalis, fibris radicalibus gracilibus. Folia radicalia semipedalia 1–1½ lin. lata, venis tenuibus immersis. Scapus copiose dichotome furcatus, inferne subteres, ramis ascendentibus angulatis, nodis foliis reductis bracteatis. Umbellæ sæpe 20–40 ad apices ramulorum dispositi 4–6- raro multiflori. Bracteæ minutæ lanceolatæ membranaceæ. Pedicelli 1½–3 lin. longi apice articulati. Perianthium 3 lin. longum flavum segmentis ½ lin. latis dorso crebre trinervatis. Stamina *T. simplicis.* Cocci 1–3 clavati 2 lin. longi. *Australia temperata orientalis et occidentalis et Tasmania.*

Var. T. SCABRA, *R. Br. Prod.* 278; *Kunth, Enum.* iv. 612, ab typo recedit caulibus inferne hispidis et foliis margine scabris.

3. T. HUMILIS, *Endl. Pl. Preiss.* ii. 36; *F. Muell. Frag.* vii. 67. Glabra 2–3-pollicaris, foliis inferioribus anguste linearibus 2–3 poll. longis, 1½–2 lin. latis, caulibus angulatis copiose dichotome furcatis. Rami basi foliis reductis ½–1 poll. longis bracteati. Umbellæ 10–12-floræ, pedicellis ascendentibus exterioribus cernuis 4–9 lin. longis. Perianthium 4 lin. longum. *Australia occidentalis,* Preiss 1605! Oldfield!

4. T. TENELLA, *R. Br. Prod.* 278; *Schult. fil. Syst.* vii. 452; *Kunth, Enum.* iv. 612. Glabra ½–1-pedalis, foliis basalibus parvis, caulibus copiose dichotome ramosis angulatis nervosis primariis ¼ lin. crassis,

ultimis erecto-patentibus strictis 1–3 poll. longis. Bracteæ ad basin ramorum 1–1½ lin. longæ. Umbellæ terminales 2–7-floræ, pedicellis 1–1½ lin. longis. Perianthium 3 lin. longum. Stamina et cocci *T simplicis*. *Australia temperata occidentalis et orientalis.*

5. T. MURICATA, *Baker.* Caules pedales copiose dichotome furcati, graciles, primarii ½ lin. crassi, pilis albidis brevibus patentibus ubique vestiti, ramis ultimis strictis ascendentibus 1–2 poll. longis, basi bracteis minutis membranaceis præditis. Umbellæ 3–4-floræ, pedicellis 1–2 lin. longis apice articulatis. Perianthium 4 lin. longum. *Australia boreali-orientalis ad Wide Bay*, Bidwell!

6. T. ANCEPS, *R. Br. Prod.* 278; *Schult. fil. Syst.* vii. 612; *Kunth, Enum.* iv. 612.—Anthericum anceps, *Solander in Herb. Banks.* Caulis 1½–2-pedalis erectus vel diffusus copiose dichotome furcatus, ramis rigidis complanatis ½ lin. latis, ultimis 4–6 poll. longis, basi foliis reductis scariosis 6–9 lin. longis bracteatis. Umbellæ 2–4-floræ, bracteis perminutis deltoideo-cuspidatis membranaceis, pedicellis 1 lin. longis. Perianthium 3 lin. longum. Coccum non vidi. *Australis orientalis ad Cape Grafton*, Sir J. Banks!

7. T. PTEROCAULON, *Baker.* Rhizoma gracile late reptans. Caulis 1–2-pedalis erectus copiose dichotome ramosus, basi solum subteres, ramis et ramulis 3–9 poll. longis utrinque ala rigide coriacea integra ½–2 lin. lata præditis, basi foliis reductis minutis bracteatis. Umbellæ terminales 6–12-floræ, bracteis perminutis, pedicellis 3–4 lin. longis apice articulatis. Perianthium 4–4½ lin. longum, segmentis dorso laxe 7–9-nervatis. Stamina 3 lin. longa, filamentis dimidio superiore stupposis. Cocci 2 lin. longi verticaliter costati. *Australia tropicalis orientalis a Cape York ad Queensland.*

The Fungi of Brazil, including those collected by J. W. H. TRAIL, Esq., M.A., in 1874. By the Rev. M. J. BERKELEY, M.A., F.L.S., and M. C. COOKE, Esq., M.A., LL.D.

[Read January 21, 1876.]

IN the present communication it has been our primary object to enumerate and describe the fungi collected by J. W. H. Trail in 1874 in the forests of Brazil; but in order to render more complete our list of the Fungi of Brazil, we have included also the species previously described, such as the collections of Mr. Spruce, the species recorded by Messrs. Montagne, Leveillé, Fries, and others, so as to present a somewhat complete account of Brazilian Fungi as far as they have been determined.

From comparison of the total number of 437 with the 886 enumerated for Cuba, and 1190 for Ceylon, it will be concluded at once that our knowledge of the Fungi of this vast tract of very favourable country is very limited, and that but a small proportion of the whole mycologic flora is yet known. It may reasonably be assumed that the total number is not in reality less than in the smaller district comprised in the island of Ceylon.

Of the whole number of species here enumerated, three fourths and upwards belong to the *Hymenomycetes*, the numbers being

Hymenomycetes	356
Gasteromycetes	13
Hyphomycetes	7
Coniomycetes	5
Ascomycetes	55
Incomplete	1
	437

Of this total number about 300 are at present confined to Brazil, and 137 are found also in other parts of the world. The number common to Brazil and the island of Cuba is 102, whilst 40 species are also found in the United States, 33 in Europe, 34 in India (including Ceylon), 18 in the Australasian colonies, and 4 are cosmopolitan.

The *Hymenomycetes* of Cuba, with its 886 species, are 488, whilst those of Brazil with its 437 species are 356. Of these the largest number, as usual in tropical countries, belong to the genera *Agaricus*, *Marasmius*, and *Polyporus*. The following comparison is made for these three genera in Cuba, Ceylon, and Brazil, the fractions being those of the total number of species:—

	Ceylon.	*Cuba.*	*Brazil.*
Agaricus	$\frac{1}{10}$	$\frac{1}{3}$	$\frac{1}{8}$
Marasmius	$\frac{1}{17}$	$\frac{1}{27}$	$\frac{1}{10}$
Polyporus	$\frac{1}{7}$	$\frac{1}{16}$	$\frac{1}{4}$

From this comparison it will be seen that the proportion is greater for Brazil in all three genera over Ceylon, and in two out of three over Cuba. The genus *Polyporus* has 143 representatives, or more than one fourth of the total number, in Brazil, whilst it has only $\frac{1}{7}$ in Cuba and $\frac{1}{16}$ in Ceylon.

The great absence of microscopical forms in this enumeration is probably to be attributed rather to a deficiency on the part of the collectors than to their absence from the district. It is clear that we may yet anticipate considerable additions to the mycologic flora of the Brazils.

1. AGARICUS (LEPIOTA) MOLYBDITES, *Fr. Epic.* i. 13; *Nova Symb.* 6.
Brazil (*Fries*).

2. A. (LEPIOTA) CEPÆSTIPES, *Sow., Berk. Hook. Lond. Journ.* ii. (1843) 629.
Sandy ground. Oeiras (*Gardner*).

3. A. (LEPIOTA) BULBIPES. *Mont. Ann. des Sci. Nat.* sér. 4, v. 352.
On the ground. Goyaz (*Wedd.*).

4. A. (LEPIOTA) WEDDELLII, *Mont. Ann. des Sci. Nat.* sér. 4, v. 352.
On the ground. Goyaz (*Wedd.*).

5. A. (LEPIOTA) COPRINOPSIS, *Mont. Ann. des Sci. Nat.* sér. 4, v 352.
On the ground. Goyaz (*Wedd.*).

6. A. (LEPIOTA) PARDALOTUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 353.
On trunks. Matto Grosso (*Wedd.*).

7. A. (LEPIOTA) TRICHROUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 353.
On the ground. Matto Grosso (*Wedd.*).

8. A. (TRICHOLOMA) MACROPILUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 353.
On rotten wood. Matto Grosso (*Wedd.*).

9. A. (TRICHOLOMA) TEGULICIUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 354.
On trunks. Brazil (*Wedd.*).

10. A. (TRICHOLOMA) PRÆGRANDIS, *Berk. Hook. Lond. Journ.* ii. (1843) 629.
Grassy places. Minas Geraes (*Gardner*).

11. A. (CLITOCYBE) VESPERTILIO, *Berk. in Hook. Journ.* (1856) 129.
On the ground. Panuré (*Spruce*, no. 123).

12. A. (CLITOCYBE) RUDIS, *Berk. in Hook. Journ.* (1856) 31.
On the ground. (*Spruce*, no. 127).

13. A. (CLITOCYBE) ARMENIACUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 354.
In shady places. Brazil (*Wedd.*).

14. A. (CLITOCYBE) GLYPHOLOMA, *Mont. Ann. des Sci. Nat.* sér. 4, v. 354.
On rotting wood. Goyaz (*Wedd.*).

15. A. (CLITOCYBE) ŒNOCEPHALUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 354.
On the ground. Goyaz (*Wedd.*).

16. A. (Clitocybe) exsanguis, *Mont. Ann. des Sci. Nat.* sér. 4, v. 355.

On rotten wood. Matto Grosso (*Wedd*).

17. A. (Clitocybe) pistillipes, *Mont. Ann. des Sci. Nat.* sér. 4, v. 355.

On the ground. Minas Geraes (*Wedd.*).

18. A. (Clitocybe) macromphalus, *Mont. Ann. des Sci. Nat.* sér. 4, v. 355.

In woods. Goyaz (*Wedd.*).

19. A. (Clitocybe) odontellus, *Mont. Ann. des Sci. Nat.* sér. 4, v. 355.

On the ground. Goyaz (*Wedd.*).

20. A. (Collybia) rheicolor, *Berk. Hook. Lond. Journ.* ii. (1843) 630.

On rotten tree. Minas (*Gardner*).

21. A. (Collybia) Boryanus, *Berk. & Mont. Ann. des Sci. Nat.* 1849.
On trunks. Bahia (*Mont.*).

22. A. (Mycena) asterocephalus, *Mont. Ann. Ann. des Sci. Nat.* sér. 4, v. 355.

On the ground. Minas Geraes (*Wedd.*).

23. A. (Mycena) brachypus, *Mont. Ann. des Sci. Nat.* sér. 4, v. 356.
In woods on branches. Minas Geraes (*Wedd.*).

24. A. (Mycena) convolvulus, *Mont. Ann. des Sci. Nat.* sér. 4, v. 356.

On branches. Matto Grosso (*Wedd.*).

25. A. (Mycena) citriceps, *Mont. Ann. des Sci. Nat.* sér. 4, v. 356.
In woods. Serrada Estrella (*Wedd.*).

26. A. (Mycena) atropurpureus, *Mont. Ann. des Sci. Nat.* sér. 4, v. 356.

On the ground. Minas Geraes (*Wedd.*).

27. A. (Mycena) erythrellus, *Mont. Ann. des Sci. Nat.* sér. 4, v. 356.

On the ground. Goyaz (*Wedd.*).

28. A. (Mycena) submurinus, *Mont. Ann. des Sci. Nat.* sér. 4, v. 357.

In woods. Goyaz (*Wedd.*).

29. A. (Mycena) chloroticus, *Mont. Ann. des Sci. Nat.* sér. 4, v. 357.

In woods. Matto Grosso (*Wedd.*).

30. A. (MYCENA?) PLORANS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 357.
On rotten wood. Matto Grosso (*Wedd.*).

31. A. (MYCENA) VIOLACEO-MARGINATUS, *Mont. l. c.* p. 358.
On trunk of a Palm called Acuri, near the river Paraguay. In moist woods, Brazil.

32. A. (MYCENA) PILEUM TURCICUM, *Mont. Ann. des Sci. Nat.* sér. 4, v. 357.
On trunks. Matto Grosso (*Wedd.*).

33. A. (OMPHALIA) GARDNERI, *Berk. Hook. Journ.* ii. (1843) 427, 631.
Palm leaves. Prov. Goyaz (*Gardner*).

34. A. (OMPHALIA) HYPOLEUCUS, *Berk. in Hook. Journ.* (1856) 132.
On trunks of trees. Panuré (*Spruce,* no. 4).

35. A. (OMPHALIA) SMARAGDINUS, *Berk. in Hook. Journ.* (1856) 131.
On the ground. Panuré (*Spruce,* no. 8).

36. A. (OMPHALIA) EUOMPHALOS, *Berk. in Hook. Journ.* (1856) 131.
On the ground. Panuré (*Spruce,* nos. 122, 133).

37. A. (OMPHALIA) CAMPANELLA, *Batsch., Fr. Ep.* p. 126.
River Amazon (*Spruce*).

38. A. (OMPHALIA) IANTHINOPHÆUS, *Mont. Ann. Sci. Nat.* sér. 4, v. 358.
On trunks. Matto Grosso (*Wedd.*).

39. A. (OMPHALIA) FLAVOLIVENS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 358.
On wood. Goyaz (*Wedd.*).

40. A. (OMPHALIA) NAUSEABUNDUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 359.
On trunks.

41. A. (PLEUROTUS) XYLOCHARIS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 359.
On branches. Goyaz (*Wedd.*).

42. A. (PLEUROTUS) JACKSONI, *B. & C.* Pileo tenui, radiato-striato, postice fortiter depresso, stipite primum centrali, dein laterali, brevi, cylindrico; lamellis tenuibus decurrentibus, acie integris.
On decayed wood. Mauhes (*Traill,* no. 125).
Pileus 3 inches across, conchiform, at first entire, then lateral; stem ⅓ inch high, about 1 line thick; gills numerous, shortly decurrent. Mr. Jackson has sent the same thing from the Kew Museum, received from Amoy. The figure of *Lentinus hispidosus,* Fr., in Kalkbrenner gives a good idea of the habit. The colour of the plant when fresh

is uncertain. Traill, no. 51, from Obydos, Brazil, described as reddish brown, has no spores; and therefore the subgenus is doubtful.

43. A. (VOLVARIA) CNEMIDOPHORUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 360.
In pastures (*Wedd.*). On the ground. Bolivia.

44. A. (PHOLIOTA) TRAILLII, *B. & Cooke.* Pileo hemisphærico dense piloso-squamoso, fulvo, margine inflexo; stipite subæquali furfuraceo-squamoso pallido, annulo membranaceo; sporis pure fulvis.
On decayed wood. Teffé, Dec. 1874 (*Traill,* no. 129).
Pileus, when dry, more than ½ an inch across, but probably when fresh much larger, tawny, clothed densely with pilose scales; stem 1 inch high, 1½ line thick, paler but clothed with tawny scales; ring membranaceous, white; spores pure tawny, like those of *A. spectabilis.*

45. A. (HEBELOMA) PSAMMINUS, *Berk. in Hook. Journ.* (1856) 132.
On the ground. Panuré (*Spruce,* no. 124).

46. A. (NAUCORIA) PANURENSIS, *Berk. in Hook. Journ.* (1856).
On the ground. Panuré (*Spruce,* no. 124).

47. A. (NAUCORIA) MARASMIOIDES, *Berk. in Hook. Journ.* (1856).
On fragments of wood. Panuré (*Spruce,* no. 116).

48. A. (NAUCORIA) JANUARIENSIS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 360.
In pastures near Rio Janeiro.

49. A. (NAUCORIA?) SMIDIOIDES, *Mont. l. c.*
In moist pastures near Rio Janeiro.

50. A. (GALERA) FULVELLUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 360.
In woods. Brazil (*Wedd.*).

51. A. (CREPIDOTUS) ALPINIÆ, *Berk. in Hook. Journ.* (1856).
On dead stems of *Alpinia.* Rio Negro (*Spruce,* no. 114).

52. A. (PSALLIOTA) OCHROPODIUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 361.
In woods. Matto Grosso (*Wedd.*).

53. A. (PSALLIOTA) RHYTOPILUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 361.
In fields, on dung. Brazil (*Wedd.*).

54. COPRINUS TORQUATUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 361.
In moist woods. Matto Grosso (*Wedd.*).

55. C. CONSOBRINUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 361.
In moist woods. Matto Grosso (*Wedd.*).

56. C. MATUTINUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 362.
On dung. Brazil.

57. CORTINARIUS (INOLOMA) WEDDELIANUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 361.
On the ground. Brazil (*Wedd.*).

58. PAXILLUS VIRIDIS, *Berk. in Hook. Journ.* (1856) 133.
On the ground in woods. Rio Negro (*Spruce*, no. 3).

59. P. RETIARIUS, *Berk. in Hook. Journ.* (1856) 133.
On sandy soil. Panuré (*Spruce*, no. 118).

60. HYGROPHORUS NITENS, *Sow.* t. 71; *Berk. in Hook. Journ.* (1856) 134.
Panuré (*Spruce*).

61. H. SIPARIUS, *Berk. in Hook. Journ.* (1856) 134.
On the ground. Panuré (*Spruce*).

62. H. BRASILIENSIS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 361.
On the ground. Goyaz (*Wedd.*).

63. H. PRASINUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 361.
On the ground. Brazil (*Wedd.*); Paraguay.

64. CANTHARELLUS CIBARIUS, *Fr. Epic.* 365; *Berk. in Hook. Journ.* (1856) 134.
On sandy ground. Panuré (*Spruce*, no. 121). On the ground, Iripixy, Jan. 31, 1874 (*Traill*, no. 7).

65. C. BRASILIENSIS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 363.
On the ground. Brazil (*Wedd.*).

66. C. PUSIO, *Berk. in Hook. Journ.* (1856) 134.
Brazil (*Spruce*, no. 94).

67. HELIOMYCES SPRUCEI, *Berk. in Hook. Journ.* (1856) 134.
On sticks. Panuré (*Spruce*, no. 91).

68. MARASMIUS PLECTOPHYLLUS, *Mont. Ann. Sci. Nat.* sér. 4, i. p. 111; *Berk. in Hook. Journ.* (1856) 135.
On wood. Panuré (*Spruce*, no. 113).

69. M. HÆDINUS, *Berk. in Hook. Journ.* (1856) 135.
On dead leaves. Panuré (*Spruce*, no. 31).

70. M. LEONINUS, *Berk. in Hook. Journ.* (1856) 135.
On dead leaves. Panuré (*Spruce*, no. 112).

71. M. RHABARBARINUS, *Berk. in Hook. Journ.* (1856) 135.
On dead leaves. Panuré (*Spruce*, no. 140). On twigs. Rio Purus (*Traill*, no. 161).

72. MARASMIUS TAGETICOLOR, *Berk. in Hook. Journ.* (1856) 136, t. v. f. 1.
On dead twigs &c. Panuré (*Spruce*).

73. M. FULVUS, *Mont. MS.*; *Berk. in Hook. Journ.* (1856) 136.
Panuré (*Spruce*).

74. M. HELVOLUS, *Berk. in Hook. Journ.* (1856) 136.
On dead leaves (*Spruce*, no. 139).

75. M. FERRUGINEUS, *Berk. in Hook. Journ.* ii. 630 (1856) viii. 136.
On dead leaves. Panuré (*Spruce*, no. 90); Rio Purus (*Traill*, no. 93). On bark. Minas (*Gardner*).

76. M. FULVICEPS, *Berk. in Hook. Journ.* vi. 490, viii. 136.
On decayed trunks. Panuré (*Spruce*, no 90).

77. M. POLYGRAMMUS, *Mont. Syll.* p. 141.
On little twigs. Lake Iripixy, Rio Trombetas (*Traill*, no. 67).

78. M. HIRTELLUS, *B. & Br. Ceylon Fungi*, no. 382.
On leaves &c. Rio Purus (*Traill*, nos. 90, 92).

79. M. FLAMMANS, *Berk. in Hook. Journ.* (1856) 136.
On dead leaves. Panuré (*Spruce*, no. 97).

80. M. PŒCILUS, *Berk. in Hook. Journ.* (1856) 137.
On dead leaves. Panuré (*Spruce*, no. 139).

81. M. HÆMATOCEPHALUS, *Mont.*, *Berk. in Hook. Journ.* (1856) 173.
On dead twigs, leaves, &c. Panuré (*Spruce*); Rio Jurua, Rio Purus (*Traill*, nos. 74, 91, 118).

82. M. ATRORUBENS, *Berk. in Hook. Journ.* (1856) 137.
Amongst dead leaves &c. Panuré (*Spruce*, nos. 105, 101, 106).

83. M. RUBRICOSUS, *Mont. Syll.* p. 138.
On dead wood. Resaca; Rio Purus (*Traill*. no. 59).

84. M. DECURRENS, *Mont. Ann. Sci. Nat.* sér. 4, i. 118; *Berk. in Hook. Journ.* (1856).
On dead twigs. Panuré (*Spruce*, no. 107).

85. M. CAATINGENSIS, *Berk. in Hook. Journ.* (1856) 137.
On the ground. Rio Uaupés (*Spruce*, nos. 85, 86, 87, 95).

86. M. MITIUSCULUS, *Berk. Hook. Lond. Journ.* ii. (1843) 631.
On rootlets. Minas (*Gardner*).

87. **Marasmius inoderma**, *Berk. in Hook. Journ.* (1851) 15.
Para (*Spruce*).

88. **M. brasiliensis**, *Berk. & Mont. Ann. des Sci. Nat.* (1849) 236.
On branches. Bahia (*Blanchet*).

89. **M. dilatatus**, *Berk. in Hook. Journ.* (1856) 138.
On dead branches. Panuré (*Spruce*, nos. 93, 109).

90. **M. omphalodes**, *Berk. in Hook. Journ.* (1856) 138.
On fragments of dead vegetables. Panuré (*Spruce*, no. 131).

91. **M. pulchellus**, *Berk. in Hook. Journ.* (1856) 138.
On dead leaves. Panuré (*Spruce*, no. 99).

92. **M. cladophyllus**, *Berk. in Hook. Journ.* (1856) 138.
On dead leaves. Panuré (*Spruce*, no. 89).

93. **M. epileucus**, *Berk. in Hook. Journ.* (1856) 139.
On dead sticks. Panuré (*Spruce*).

94. **M. nivosus**, *Berk. in Hook. Journ.* (1856) 139.
On sticks, ferns, &c. Panuré (*Spruce*).

95. **M. obscurus**, *Berk. in Hook. Journ.* (1856) 139.
On dead leaves. Panuré (*Spruce*, no. 138).

96. **M. bellus**, *Berk. in Hook. Journ.* (1856) 139.
Rio Negro (*Spruce*, no. 102).

97. **M. hippiochætes**, *Berk. in Hook. Journ.* (1856) 139.
On wood, stalks, &c. Rio Uaupés (*Spruce*, no. 88).

98. **M. cupressiformis**, *Berk. in Hook. Journ.* (1856) 140, t. v. f. 3.
On dead leaves. Panuré (*Spruce*, no. 75).

99. **M. populiformis**, *Berk. in Hook. Journ.* (1856) 140, t. v. f. 2.
On dead twigs &c. Panuré (*Spruce*).

100. **M. coilobasis**, *Berk. in Hook. Journ.* (1856) 141.
On dead trunks. Panuré (*Spruce*, no. 1).

101. **M. ignobilis**, *B. & Br. Ceylon Fungi*, no. 390.
On little twigs. Rio Purus (*Traill*, no. 85).

102. **M. aleurites**, *B. & Cooke.* Pusillus, dealbatus; pileo demum reflexo, albo, stipiteque opacis albo-pulverulentis; lamellis angustis, undulatis, crassiusculis, obtusis.
On dead sticks. Obydos, Feb. 13, 1874 (*Traill*, no. 56).

About 1½ line wide; stem very short, at length quite resupinate.

Agrees in habit with *A. nidulus*, B. & C., and *M. ignobilis*, but very different.

103. MARASMIUS TRAGANUS, *B. & Cooke.* Albus, pusillus; pileo rugoso-caperato, membranaceo, umbonato; stipite filiformi, e basi orbiculari tomentosa oriundo; lamellis paucis, latis decurrentibus.

On dead sticks. Rio Jurua (*Traill*, no. 62).

Pileus ¼ inch across, wrinkled, with a minute umbo, stem filiform, ½ inch high, springing from an orbicular tomentose base; gills broad, decurrent.

104. M. SPANIOPHYLLUS, *B. sub* Agarico; *Hook. Lond. Journ.* (1843) 631.

On dead sticks (*Traill*, no. 111). Goyaz (*Gardner*).

105. M. RUFOPUNCTATUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 363.
On trunks. Matto Grosso (*Wedd.*).

106. M. WEDDELLIANUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 363.
Amongst leaves. Minas Geraes (*Wedd.*).

107. M. RUFO-STRIATULUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 364.
In woods amongst leaves. Matto Grosso (*Wedd.*).

108. M. LUTEUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 364.
Amongst leaves. Matto Grosso (*Wedd.*).

109. LENTINUS VILLOSUS, *Fr. Epic.* 388; *Berk. in Hook. Journ.* (1856) 141.

On decayed wood. Minas (*Gardner*); Panuré (*Spruce*, no. 128); Brazil (*Traill*, no. 73).

Traill's no. 79 is a *Lentinus* closely allied to *L. villosus*, but with entire gills. The species is possibly new; but the specimens are in bad condition.

110. L. FUMIGATUS, *Lév. Ann. d. Sci. Nat.* sér. 3, v. 117; *Berk. in Hook. Lond. Journ.* (1856) 141.

111. L. TENER, *Kl.*; *Fr. Epic.* i. 389; *Berk. in Hook. Journ.* (1856) 142.

On decayed wood (*Gardner*). Rio Negro (*Spruce*).

112. L. CRINITUS, *L.* (*sub* Agarico).
On dead wood. April 15, 1874, Villa Bella (*Traill*, no. 71).

113. L. SCHWARTZII, *Berk. Hook. Lond. Journ.* ii. (1843) 632.
Brazil (*Gardner*).

114. Lentinus Schombergii, *B. Linn. Trans.* xx.
On dead wood. Rio Maubes below rapids (*Traill*, no. 105).

115. L. crassipes, *Berk. Hook. Lond. Journ.* ii. (1843) 633.
Minas Geraes (*Gardner*).

116. L. Nicotiana, *Berk. in Hook. Journ.* (1856) 141, t. v. f. 7.
On decayed trunks. Panuré (*Spruce*, no. 45).

117. L. velutinus, *Fr. Ep.* i. 392; *Hook. Journ.* ii. (1843) 633.
Minas Geraes (*Gardner*).

118. L. calvescens, *Berk. in Hook. Journ.* (1856) 141.
On decayed trunks. Panuré (*Spruce*, no. 136).

119. L. fulvaster, *B. & Cooke.* Pileo orbiculari, albo, sicco fulvescente, umbilicato, glabro; stipite gracili, glabro, concolori; lamellis angustis, dentatis.
On dead wood. Resaca, Rio Purus, Nov. 1, 1874 (*Traill*, no. 50).
Pileus orbicular, ¾ in. in diameter, umbilicate, at first white, but becoming, like the rest of the plant, tawny when dry; stem slender, 2 in. high, about 1 line thick, smooth; gills narrow, decurrent. Varying much in size, stem sometimes almost capillary.

120. L. furcatus, *B. & Cooke.* Albus; pileo reniformi-flabellato, glabro, sicco radiato-subrugoso, margine inflexo; stipite brevi, hirto; lamellis tenuibus, celluloso-furcatis, dentatis, decurrentibus.
On dead wood. Rio Solimões, Nov. 1874 (*Traill*, no. 7).
Pileus 2½ in. across, smooth, but marked with little pits and ridges; stem lateral, scarcely ½ in. high, 2 lines thick, shortly hispid; gills crowded, thin, with a jagged margin, decurrent, forked, and cellular.

If the division of the gills were carried further, the species would belong to *Favolus*.

121. L. compressus, *B. & Cooke.* Albus; pileo flabelliformi, radiato-lineato, stipiteque brevi sursum canaliculato-compresso, velutinis; lamellis tenuibus decurrentibus, laciniatis.
On dead wood. Teffé (*Traill*, no. 124).
Pileus 1½ in. across, flabelliform, clothed with thin velvety down, as is also the short stem (¾ in. high, ¼ thick above), which is compressed in consequence of a depression continued from the pileus, and dilated upwards, where it runs laterally into the pileus; gills very thin, the edge strongly laciniate.

122. L. albidus, *Berk. in Hook. Journ.* ii. (1843).
On a Lime tree (*Gardner*).

123. LENTINUS LEUCOCHROUS, *Lév. Ann. Sci. Nat.* 1844, t. 14. f. 1.
On dead wood. Teffé (*Traill*, no. 106).

124. L. TRICHOLOMA, *B. & Cooke.* Albus; pileo orbiculari, umbilicato, glabro, margine ciliato; stipite gracili, glabrescente, lamellis angustis, arcuatis, parce dentatis, decurrentibus.
On dead wood. Rio Jurua, April 25, 1873 (*Traill*, no. 35).
Pileus orbicular, ⅓ in. across, smooth, umbilicate, with the margin fringed; stem slender, central, ¾–1 in. high, at first somewhat scaly, then quite smooth.

The habit is exactly that of *Polyporus tricholoma*, M.

125. L. SUBMEMBRANACEUS, *Berk. in Hook. Journ.* ii. (1843).
On dead tree. Minas (*Gardner*).

126. L. GUILLEMINIANUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 364.
On trunks. Brazil (*Wedd.*).

127. L. CONCHATUS, *Mont. l. c.* p. 365.
On moist wood. Rio Janeiro.

128. PANUS RETICULATUS, *Berk. in Hook. Journ.* (1856) 142.
On the ground amongst leaves. Panuré (*Spruce*, no. 130).

129. P. SPRUCEI, *Berk. in Hook. Journ.* (1856) 142, t. v. f. 6.
On decayed wood. Panuré (*Spruce*, no. 74).

130. P. VISCIDUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 366.
On trunks. Minas Geraes (*Wedd.*).

131. P. CUNEATUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 366.
On wood. Goyaz (*Wedd.*).

132. SCHIZOPHYLLUM COMMUNE, *Fr. Epic.* i. 403; *Berk. Hook. Journ.* (1856) 143.
Rio Negro (*Spruce*, no. 137); Caripi (*Spruce*); Brazil (*Traill*, no. 99).

133. S. UMBRINUM, *Berk. in Hook. Journ.* (1851) 15, t. i. fig. 1.
Caripi (*Spruce*).

134. LENZITES APPLANATA, *Fr. Epic.* p. 404; *Berk. in Hook. Lond. Journ.* ii. (1843); *Kew Gard. Journ.* (1856) 143.
On dead trunks. Goyaz; Minas (*Gardner*). Rio Negro (*Spruce*, no. 66).

135. L. DEPLANATA, *Fr. Epic.* i. 404; *Berk. in Hook. Journ.* (1856).
On dead trunks. Rio Negro (*Spruce*, nos. 65, 59).

136. L. BRASILIENSIS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 366.
On Trunks. Brazil (*Wedd.*).

137. **Lenzites striata**, *Swartz* (sub *Agarico*); *Fr. Epic.* i. 406; *Berk. in Hook. Journ.* (1856) 143.
On half-burnt logs, Rio Negro (*Spruce*, no. 132). On dead wood, Obydos (*Traill*, no. 108).

138. **Polyporus (Mesopus) Weddellii**, *Mont. Ann. des Sci. Nat.* sér. 4, v. 366.
On the ground. Brazil (*Wedd.*).

139. **P. (Mesopus) lentus**, *Berk. Eng. Fl.* v. 134; *Hook. Lond. Journ.* ii. (1843) 635.
On rotten stem. Brazil (*Gardner*).

140. **P. (Mesopus) guianensis**, *Mont. Syll.* p. 153.
On dead wood. Rio Purus (*Traill*, no. 89).

141. **P. (Mesopus) similis**, *Berk. Hook. Lond. Journ.* ii. (1843) 635.
On old trees. Minas (*Gardner*).

142. **P. (Mesopus) apalus**, *Berk. Hook. Lond. Journ.* ii. (1843) 635.
On rotten trees. Minas (*Gardner*).

143. **P. (Mesopus) stipitarius**, *B. & Curt. Cuban Fungi*, no. 183.
On dead wood. Teffé, Oct. 19, 1874 (*Traill*, no. 72).

144. **P. (Mesopus) augustus**, *Berk. in Hook. Journ.* (1856) 143.
On dead branches. Panuré (*Spruce*, no. 211).

145. **P. (Mesopus) oblectans**, *Berk. in Hook. Journ.* (1856) 175.
On dead wood.

146. **P. (Mesopus) luteo-nitidus**, *Berk. in Hook. Journ.* (1856) 175.
On the ground. Panuré (*Spruce*, no. 51).

147. **P. (Mesopus) camerarius**, *Berk. in Hook. Journ.* (1856) 143.
On dead trunks. Panuré (*Spruce*, nos. 171, 197).

148. **P. (Mesopus) partitus**, *Berk. in Hook. Journ.* (1856) 169.
On wood. Panuré (*Spruce*, no. 205).

149. **P. (Mesopus) partitus**, *Berk. in Hook. Journ.* (1856) 170, t. v. f. 1.
On the ground. Panuré (*Spruce*, nos. 20, 200).
Var. β. **cuneatus**, *Berk. ib.* Panuré (*Spruce*, no. 180).

150. **P. (Mesopus) renatus**, *Berk. in Hook. Journ.* (1856) 170.
On the ground. Panuré (*Spruce*, no. 169).

151. **Polyporus (Mesopus) heteromorphus**, *Lév. Ann. Sci. Nat.* Feb. 1846; *Berk. in Hook. Journ.* (1856) 171.
On dead wood and on the ground. Panuré (*Spruce*, nos. 16, 33, 54).

152. **P. (Mesopus) cassiæcolor**, *Berk. in Hook. Journ.* (1856) 171.
On the ground. Panuré (*Spruce*, no. 189).

153. **P. (Mesopus) procerus**, *Berk. in Hook. Journ.* (1856) 171.
On the ground. Panuré (*Spruce*, no. 165).

154. **P. (Mesopus) xylodes**, *Berk. in Hook. Journ.* (1856) 171.
On the ground. Panuré (*Spruce*, no. 42).

155. **P. (Mesopus) omphalodes**, *Berk. in Hook. Journ.* (1856) 172.
On the ground, rarely on trunks. Panuré (*Spruce*, nos. 32, 194).

156. **P. (Mesopus) ocellatus**, *Berk. in Hook. Journ.* (1856) 172, t. x. f. 3.
On the ground. Panuré (*Spruce*, no. 192).

157. **P. (Mesopus) exilis**, *Berk. in Hook. Journ.* (1856) 173.
On the ground. Panuré (*Spruce*, no. 31).

158. **P. (Mesopus) parmula**, *Berk. in Hook. Journ.* (1856) 173.
On the ground. Panuré (*Spruce*, no. 34).

159. **P. (Mesopus) marasmioides**, *Berk. in Hook. Journ.* (1856) 173.
On the ground. Panuré (*Spruce*, nos. 21, 77).

160. **P. (Mesopus) hypoplastus**, *Berk. in Hook. Journ.* (1856) 174.
Panuré (*Spruce*, no. 53).

161. **P. (Mesopus) diabolicus**, *Berk. in Hook. Journ.* (1856) 174.
On dead trunks. Panuré (*Spruce*, no. 195).

162. **P. (Mesopus) rufo-atratus**, *Berk. in Hook. Journ.* (1856) 174.
On decayed trunks. Panuré (*Spruce*, no. 174).

163. **P. (Mesopus) vernicosus**, *Berk. in Hook. Journ.* (1856) 175.
On decayed trunks. Panuré (*Spruce*, no. 50).

164. **P. (Mesopus) calcigenus**, *Berk. Hook. in Lond. Journ.* ii. (1843) 636.
On calcareous soil. Goyaz (*Gardner*).

165. **P. (Mesopus) perula**, *Fr. Epic.* i. 437; *Nova Symb.* 57.
On trunks. Brazil (*Fr.*).

166. **Polyporus (Pleuropus) picipes**, *Fr. Epic.* i. 440; *Berk. in Hook. Journ.* (1856) 195.

On trunks. Panuré (*Spruce*).

167. **P. (Pleuropus) infernalis**, *Berk. Hook. Lond. Journ.* ii. (1843) 637.

On stem of old tree. Minas Geraes (*Gardner*).

168. **P. (Pleuropus) seminigrita**, *B. & Cooke.* Pusillus; pileo tenui umbilicato, margine membranaceo, inflexo; stipite abrupte nigro; poris subhexagonis, acie obtusa.

On dead wood. Obydos, Feb. 1st, 1874 (*Traill*, no. 102).

Pileus ½ an inch or more across, smooth, infundibuliform, margin very thin; stem 2 lines high, dilated above, about 1 inch thick, abruptly black; pores subhexagonal, with an obtuse margin, about ·01 inch across.

Belongs to the same group as *P. varius*, but quite distinct.

169. **P. (Pleuropus) grammocephalus**, *Berk. Hook. Lond. Journ.* (1842) p. 148.

Var. poris minoribus.

On dead wood. Obydos (*Traill*, no. 96).

Quite agreeing with *P. grammocephalus*, but with rather smaller pores. Specimens, however, from different localities differ in this respect.

170. **P. (Pleuropus) Leprieurii**, *Mont. Ann. des Sci. Nat.* sér. 2, xiii. 203; *Berk. in Hook. Journ.* (1856) 195.

On dead trunks. Panuré (*Spruce*, no. 202).

171. **P. (Pleuropus) passerinus**, *Berk. in Hook. Journ.* (1856) t. x. f. 2, 175.

In woods. Panuré (*Spruce*).

172. **P. (Pleuropus) opacus**, *Berk. & Mont. Ann. des Sci. Nat.* 1849, 236.

On wood. Bahia (*Blanchet*).

173. **P. (Pleuropus) Blanchetianus**, *Berk. & Mont. Ann. des Sci. Nat.* 1849, 238.

On trunks. Bahia (*Blanchet*).

174. **P. (Pleuropus) auriscalpium**, *Pers. Gaud. Voy.*; *Mont. Ann. des Sci. Nat.* sér. 4, v. 366.

On trunks. Brazil (*Wedd.*).

175. **P. (Pleuropus) lucidus**, *Fr. Epic.* i. 442; *Berk. in Hook. Journ.* (1856) 194.

On dead trunks. Trombetas (*Traill*, no. 170, a form scarcely laccate). Panuré (*Spruce*, nos. 48, 67, 79, 172). Rio Jurua, Oct. 20, 1874 (*Traill*, no. 107).

176. POLYPORUS (PLEUROPUS) PES-SIMIÆ, *Berk. in Hook. Journ* (1856).

On rotten trunks. Panuré (*Spruce*, no. 212).

177. P. (PLEUROPUS) MACER, *Berk. in Hook. Journ.* (1856) 176.

Panuré (*Spruce*).

178. P. (PLEUROPUS) PALLIDUS, *Berk. in Hook. Journ.* (1856) 176.

On dead wood. Panuré (*Spruce*).

179. P. (PLEUROPUS) BRUNNEOPICTUS, *Berk. in Hook. Journ.* (1856) 176.

On dead wood. Panuré (*Spruce*, no. 55).

180. P. (PLEUROPUS) SEMICLAUSUS, *Berk. in Hook. Journ.* (1856) 193.

On decaying trunks. Panuré (*Spruce*, nos. 56, 200).

181. P. (PLEUROPUS) VARIABILIS, *Berk. in Hook. Journ.* (1856) 193, t. ix. f. 1.

On the ground. Panuré (*Spruce*, nos. 57, 183, 207).

182. P. (PLEUROPUS) SANGUINEUS, *Fr. Epicr.* i. 444; *Berk. in Hook. Journ.* (1856) 196.

Panuré (*Spruce*, nos. 187, 46). Caripi, Para (*Spruce*). Teffé, Dec. 1874 (*Traill*, nos. 3, 60, 126).

183. P. (PLEUROPUS) MUTABILIS, *Berk. & Curt. in Ann. Nat. Hist.* 1853, p. 433; *Berk. in Hook. Journ.* (1856) 196.

On dead wood. Panuré (*Spruce*, nos. 173, 176, 30).

184. P. (PLEUROPUS) LUTEUS, *Nees, Fr. Epic.* i. 445; *Berk. in Hook. Journ.* (1856) 196; *id. ib.* (1843) 637.

On dead wood. Panuré (*Spruce*, no. 19). Brazil (*Gardner*), with *Stereum elevatum* (*Traill*, no. 130).

185. P. (PLEUROPUS) HINNULEUS, *B. & Cooke.* Flavo-fuscus; pileo cuneiformi, radiato-lineato, margine lobato; stipite brevissimo cum pileo confluente; poris irregularibus, dissepimentis tenuibus, decurrentibus.

On dead wood. Rio Trombetas, Jan. 31, 1874 (*Traill*, no. 11).

Yellow-brown; pileus subcoriaceous, cuneiform, with a lobed margin, thickly and finely radiato-striate, 1¼ inch across; stem very short, and confluent with pileus; pores irregular, with thin dissepiments, about $\frac{1}{36}$ inch across, edge jagged.

186. Polyporus (Pleuropus) porphyritis, *Berk. in Hook. Journ.* (1856) 196.

On dead trunks. Panuré (*Spruce*, no. 182).

187. P. (Pleuropus) hemibaphus, *Berk. in Hook. Journ.* (1856) 193.

On dead wood. Panuré (*Spruce*).

188. P. (Pleuropus) atropurpureus, *Berk. in Hook. Journ.* (1856) 194.

On the ground. Panuré (*Spruce*). Iripixy (*Traill*, no. 139).

189. P. (Pleuropus) affinis, *Fr. Epic.* i. 445.

On dead wood. Rio Jutahy (*Traill*, no. 135).

190. P. (Pleuropus) stereinus, *Berk.* (*non* P. stereoides, *Fr.*), *Cuban Fungi*, no. 212.

On dead wood. Trombetas, March 3, 1874 (*Traill*, no. 160).

191. P. (Pleuropus) gallinaceus, *B. & Cooke.* Pileo tenui, chartaceo, flabelliformi, zonato, postice umbilicato, subtiliter tomentoso, glabrescente, radiato-lineato; stipite cylindrico, tomentoso, e basi orbiculari oriundo, poris minimis.

On dead wood. Obydos, Feb. 12, 1874; Rio Purus (*Traill*, nos. 58, 83, 95).

Pileus $1\frac{3}{4}$ in. across, ochraceous, with frequent darker zones, sometimes inclined to brown; margin very thin, sometimes jagged; stem $\frac{1}{2}$ in. high, 1 line thick, the pileus running down the wood beyond the orbicular base. Pores $\frac{1}{200}$ in. across.

Allied to *P. stereinus*, B. A smaller form occurred at Rio Purus (Trail's no. 88), resembling somewhat in form and colouring a turkey's feather.

192. P. (Pleuropus) rhipidius, *Berk. in Hook. Journ.* (1856), 195.

On wood in forests. Rio Negro (*Spruce*, no. 168). Amazon.

193. P. (Pleuropus) decolor, *Berk. in Hook. Journ.* (1856) 195.

On decayed trunks. Panuré (*Spruce*, no. 47).

194. P. (Pleuropus) nephridius, *Berk. in Hook. Journ.* (1856) 195.

On a dead trunk. Panuré (*Spruce*, nos. 164, 210).

195. P. (Pleuropus) Dietrichsenii, *Fr.*

Var. poris minoribus.

Rio Trombetas, Jan. 31, 1874. Manaos, Dec. 30, 1874 (*Traill*, nos. 52, 8).

In the same specimen one individual has a cylindrical stem, while two others joined to it laterally are quite stemless, attached simply by the vertex.

196. Polyporus (Merisma) polydactylus, *Berk. in Hook. Journ.* (1856) 196.

Amongst roots of trees. Panuré (*Spruce*, no. 59).

197. P. (Anodermei) nivosus, *Berk. in Hook. Journ.* (1856) 197.

On dead wood. Panuré (*Spruce*, no 192).

198. P. (Anodermei) armeniacus, *Berk. in Hook. Journ.* (1856) 197.

On dead trunks. Panuré (*Spruce*, nos. 39, 191).

199. P. (Anodermei) detritus, *Berk. in Hook. Journ.* (1856) 197.

On dead wood. Panuré (*Spruce*, nos. 43, 49, 191).

200. P. (Anodermei) eudothrix, *Berk. in Hook. Journ.* (1856) 197.

On palings. San Carlos (*Spruce*).

201. P. (Anodermei) trichomallus, *Berk. & Mont. Ann. des Sci. Nat.* 1849, 238.

On dead wood. Prainha; Cararaucu (*Traill*, no. 56).

202. P. (Anodermei) substuppeus, *B. & Cooke.* Pileo dimidiato, postice decurrente, rugoso, brevi, floccis substuppeis vestito; poris subhexagonis, acie tenuibus.

On dead wood (*Traill*, no. 123).

Pileus $\frac{1}{2}$ in. long, $1\frac{1}{2}$ or more wide, dimidiate, decurrent behind, pale ochraceous when dry, radiato-rugose, clothed with depressed spongy down; pores about $\frac{1}{40}$ in. diameter, but variable; dissepiments thin, acute.

Traill's no. 64, from Obydos, Feb. 12, 1874, is a resupinate form.

203. P. (Anodermei) intercalaris, *B. & Cooke.* Imbricatus; pileis brevibus subzonatis, rugosis, hispidis, bicoloribus, postice decurrentibus; poris parvis.

On dead wood. Teffé, Oct. 19, 1874 (*Traill*, no. 77).

Imbricated, short, laterally confluent, decurrent behind; pilei about half an inch long, with one or two zones, darker behind, hispid; margin very thin; pores about $\frac{1}{60}$ in. diameter.

204. P. (Placodermei) petalodes, *Berk. in Hook. Journ.* (1856) 198.

On dead trunks. Panuré (*Spruce*, no. 36).

205. POLYPORUS (PLACODERMEI) ZONALIS, *König, Berk. Hook. Journ.* (1847) 504, (1856) 198.
On decayed trunks. Panuré (*Spruce,* nos. 68, 208). On dead wood. Teffé, Dec. 18, 1874; Lago cerrado, Rio Jurua, Oct. 30, 1874 (*Traill,* no. 122).

206. P. (PLACODERMEI) AUBERIANUS, *Mont. Cub.* p. 399.
Brazil (*M. J. B.*).

207. P. (PLACODERMEI) MARTIUS, *Berk. in Hook. Journ.* (1856) 198.
On dead wood. Panuré (*Spruce*).

208. P. (PLACODERMEI) FASCIATUS, *Fr. Epic.* p. 471; *Berk. in Hook. Journ.* (1856) 198.
On decayed trunks. Panuré (*Spruce,* nos. 58, 171).

209. P. (PLACODERMEI) AUSTRALIS, *Fr. Epic.* i. 464; *Berk. in Hook. Lond. Journ.* (1843) 673, *in Hook. Journ.* (1856) 198.
On trunks. Panuré (*Spruce,* no. 570). Teffé, Oct. 19, 1874 (*Traill,* no. 70). Minas Geraes (*Gardner*).

210. P. (PLACODERMEI) APPLANATUS, *Fr.*
On dead wood. Obydos, June 24; Rio Jurua, Nov. 10, 1874 (*Traill,* nos. 53, 98).

211. P. (PLACODERMEI) IGNIARIUS, *Fr. Epic.* i.
Var. RESUPINATUS, *Berk. in Hook. Journ.* (1856) 198.
Panuré (*Spruce,* no. 213).

212. P. (PLACODERMEI) SENEX, *Mont. Ann. Sci. Nat.* sér. 2, v. p. 70; *Berk. in Hook. Journ.* (1856) 198.
On decayed trunks. Panuré (*Spruce,* no. 61).
Var. margine obtuso (*Traill,* no. 54).

213. P. (PLACODERMEI) SCALARIS, *Berk. in Hook. Journ.* (1856) 199.
On dead trunks. Panuré (*Spruce,* nos. 62, 199).

214. P. (PLACODERMEI) INFLEXIBILIS, *Berk. Hook. Journ.* (1856) 199.
On dead trunks. Panuré (*Spruce,* nos. 52, 181).

215. P. (PLACODERMEI) LICNOIDES, *Mont. Ann. Sci. Nat.* sér. 2, xiii. 204; *Berk. in Hook. Journ.* (1856) 199.
On dead trunks. Panuré (*Spruce*).

216. P. (PLACODERMEI) ATRO-UMBRINUS, *Berk. in Hook. Journ.* (1856) 199.
On dead wood. Rio Negro (*Spruce*).

217. POLYPORUS (PLACODERMEI) FERREUS, *Berk. in Hook. Lond. Journ.* 1847, p. 502.
Brazil (*M. J. B*).

218. P. (PLACODERMEI) HORNODERMUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 368.
On trunks. Brazil (*Wedd.*).

219. P. (PLACODERMEI) FLAVESCENS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 368.
On trunks. Brazil (*Wedd.*).

220. P. (PLACODERMEI) RHYTIPHLŒUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 369.
On trunks. Minas Geraes (*Wedd.*).

221. P. (PLACODERMEI) CAPUCINUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 369.
On trunks. Brazil.

222. P. (PLACODERMEI) CARNEUS, *Nees, Fr. Epic.* i. 471.
Brazil (*M. J. B.*).

223. P. (INODERMEI) PLEBEIUS, *Berk. Flor. N. Zeal.* p. 179.
On dead wood. Rio Purus; R. Jurua, Nov. 11, 1874; Obydos (*Traill*, nos. 15, 69, 100).

224. P. (INODERMEI) HASKARLII, *Lév. Ann. Sci. Nat.* 1844, ii. 190.
Brazil.

225. P. (INODERMEI) MYRRHINUS, *Kickx, Mont. Cub.* 394.
Brazil (*M. J. B.*).

226. P. (INODERMEI) CHRYSITES, *Berk. in Hook. Journ.* (1856) 233.
On dead trunks. San Carlos (*Spruce*).

227. P. (INODERMEI) CUPREO-ROSEUS, *Berk. in Hook. Journ.* (1856) 253.
On dead trunks. Panuré (*Spruce*).

228. P. (INODERMEI) FLORIDANUS, *Berk. in Ann. Nat. Hist.* x. 376; *Hook. Journ.* (1856) 234.
On trunks. San Carlos (*Spruce*). Rio Purus; Obydos, Oct. 12, 1874 (*Traill*, nos. 49, 66).

229. P. (INODERMEI) ALBOCERVINUS, *Berk. in Hook. Journ.* (1856) 234.
On trunks. Panuré (*Spruce*, no. 22).

230. P. (INODERMEI) PSILODERMEUS, *Berk. & Mont. Ann. des Sci. Nat.* 1849, 239.
On trunks. Bahia (*Blanchet*).

231. POLYPORUS (INODERMEI) IODINUS, *Mont. Syll.* p. 167.
Brazil (*M. J. B.*).

232. P. (INODERMEI) HIRSUTUS, *Fr. Epic.* i. 477; *Berk. in Hook. Journ. Bot.* (1856) 234.
On trunks. Panuré (*Spruce*, nos. 28, 60). Rio Mauhes, May 1, 1874; Prainha (*Traill*, nos. 4, 82).

No. 120, from the same locality, is probably the same, but almost destroyed by insects.

233. P. (INODERMEI) CAPERATUS, *Klotsch. Ann. Nat. Hist.* iii. 391; *Berk. in Hook. Journ.* 1856.
On dead trunks. Panuré (*Spruce*, no. 23).

234. P. (INODERMEI) SULCIFER, *B. & Cooke.* Pileo vertice affixo, transversim elongato, sulcato, interstitiis elevatis, spongioso-velutinis, umbrinis, sulcis brunneis; contextu fulvo; poris mediis hexagonis, umbrinis; dissepimentis tenuibus.
On dead wood. Pio Purus, Sept. 1874 (*Traill*, no. 97).
Pileus ¾ in. long, 1¼ broad, dimidiate, marked with deep brown furrows, and raised umber velvety ribs; pores about $\frac{1}{48}$ in. in diameter.

Resembles *P. caperatus*, but with very different pores, by which it approaches *Hexagona*.

235. P. (INODERMEI) ACULEANS, *Berk. in Hook. Journ.* (1856) 199.
On dead wood. Panuré (*Spruce*, no. 188).

236. P. (INODERMEI) VESPILLONEUS, *Berk. in Hook. Journ.* (1856) 199.
On dead trunks. Rio Uaupés (*Spruce*, no. 177

237. P. (INODERMEI) XEROPHYLLACEUS, *Berk. in Hook. Journ.* (1856) 200.
On dead wood. Panuré (*Spruce*, no. 179).

238. P. (INODERMEI) HOLOSCLERUS, *Berk. in Hook. Journ.* (1856) 200.
On dead trunks. Panuré (*Spruce*, no. 209).

239. P. (INODERMEI) SETIPORUS, *Berk. in Hook. Journ.* (1856) 200.
S. Gabriel (*Spruce*, no. 71).

240. P. (INODERMEI) VELUTINUS, *Fr. Epic.* i. 478; *Berk. in Hook. Journ.* (1856) 234.
On dead branches. San Carlos (*Spruce*).

241. P. (INODERMEI) HÆDINUS, *Berk. in Hook. Journ.* (1856) 234.
On decaying trunks. Panuré (*Spruce*, nos. 28, 203).

242. POLYPORUS (INODERMEI) SECTOR, *Ehr. Hor. Phys. Ber.* p. 10.
Brazil (*M. J. B.*).

243. P. (RESUPINATUS) OBLIQUUS, *Fr. Epic.* p. 482.
On dead wood. Rio Javary (*Traill,* no. 101).

244. P. (RESUPINATUS) BISTRATOSUS, *B. & Cooke.* Effusus, umbrinus, contextu parcissimo; poris stratosis punctiformibus.
On dead wood. Paricatuba; Rio Purus (*Traill,* no. 78).
Effused, rather rigid, umber, with very little subiculum; pores in two layers, very minute, punctiform.

Has the habit of *P. chromaticus*; but the pores are not oblique, and the colour is altogether different.

245. P. (RESUPINATUS) CHROMATICUS, *B. & Cooke.* Effusus, citrinus; poris obliquis, minutis, integris; contextu parco.
On dead wood. Prainha, Dec. 12, 1873 (*Traill,* no. 13).
Effused, resembling in habit *P. obliquus,* lemon-coloured or pale chrome-yellow; substance scarcely any; pores minute; mycelium bright yellow.

246. P. (RESUPINATUS) CRYPTACANTHUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 369.
On bark. Brazil.

247. P. (RESUPINATUS) DEGLUBENS, *Berk. in Hook. Journ.* (1856) 235.
On dead sticks. San Carlos (*Spruce*).

248. P. (RESUPINATUS) CAVERNULOSUS, *Berk. in Hook. Journ.* (1856) 235.
On dead branches. Panuré (*Spruce,* no. 204).

249. P. (RESUPINATUS) CARNEOPALLENS, *Berk. in Hook. Journ.* (1856) 235.
On dead trunks. Panuré (*Spruce,* no. 178).

250. P. (RESUPINATUS) EVOLVENS, *Berk. in Hook. Journ.* (1856) 253.
On dead wood. San Carlos (*Spruce,* no. 214).

251. P. (RESUPINATUS) XYLOSTROMATOIDES, *Berk. Hook. Lond. Journ.* ii. (1843) 638.
On rotten wood. Minas (*Gardner*).

252. P. (RESUPINATUS) CORTICOLA, *Fr. Epicr.* p. 488.
On dead sticks. Rio Purus (*Traill,* no. 110).

253. TRAMETES FIBROSA, *Fr. El.* p. 490; *Berk. in Hook. Journ.* (1856) 235.
On dead trunks. Panuré (*Spruce,* no. 201).

254. TRAMETES HYDNOIDES, *Fr. El.* p. 490; *Berk. in Hook. Journ.* (1856) 236, (1843) 638.
On dead wood. San Carlos (*Spruce*). Minas (*Gardner*). Caripi (*Spruce*). Gaviaõ, Rio Jurua, Nov. 10, 1874; Camana, Nov. 4, 1874; Iripixy, Jan. 30, 1874 (*Traill*, nos. 115, 116, 61).

255. T. ÆTHALODES, *Mont. Ann. des Sci. Nat.* sér. 4, v. 370.
On trunks. Brazil (*Wedd.*).

256. T. ACTINOPILUS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 370.
On trunks. Brazil.

257. T. OCCIDENTALIS. *Fr. Epic.* i. 491; *Fr. Nova Symb.* 74; *Berk. Hook. Lond. Journ.* ii. (1843) 638.
On dead wood. Minas (*Gardner*). Brazil (*Fries*). Rio Negro (*Spruce*, nos. 29, 185). Rio Juruá, Oct. 28, 1874 (*Traill*, no. 121).

258. T. RIGIDA, *Berk. & Mont. Ann. des Sci. Nat.* 1849, 240.
Bahia.

259. T. SCLERODEPSIS, *Berk. in Hook. Journ.* (1856) 236.
On dead trunks. Panuré (*Spruce*, no. 167).

260. T. SPRUCEI, *Berk. in Hook. Journ. Bot.* (1856) 236.
On trunks. Panuré (*Spruce*, no. 166).

261. T. LACTINEA, *Berk. Ann. Nat. Hist.* x. 373.
Var. poris minoribus.
On dead wood. Rio Purus (*Traill*, nos. 55, 75, 81, 114).

No. 114 is a form with a thin, stipitate, slightly zoned pileus; like other white species, it is extremely variable.

262. T. MARCHIONICA, *Lév.* (*sub* Polypora), *Ann. Sci. Nat.* 1846, v. 300.
On dead wood (*Traill*, no. 113).

263. T. MULLERI, *Berk. Cuban Fungi*, no. 311.
Brazil (*M. J. B.*).

264. T. VERSATILIS, *Berk. Hook. Lond. Journ.* ii. (1843) 638.
On rotten tree. Minas (*Gardner*).

265. DÆDALEA QUERCINA, *Fr. Epicr.* i. 492.
Var. STALACTIFORMIS, *Mont. Ann. des Sci. Nat.* sér. 4, v. 370.
On trunks. Brazil (*Wedd.*)

266. D. SANGUINEA, *Fr. Epicr.* i. 495.
On dead wood (*Traill*, no. 14).

267. D. SPRUCEI, *Berk. in Hook. Journ.* (1856) 236.
On dead trunks. Panuré (*Spruce*, no. 41).

268. Hexagonia (Pleuropus) gracilis, *Berk. in Hook. Journ.* (1856) 237, t. v. fig. 4.

On the ground. Panuré (*Spruce,* no. 7).

269. H. erubescens, *Berk. in Hook. Journ.* (1856) 237.

On dead trunks. Panuré (*Spruce,* no. 40).

270. H. variegata, *Berk. Ann. Nat. Hist.* x. p. 280.

On dead wood. Rio Purus (*Traill,* no. 86).

271. H. coriacea, *B. & Cooke.* Dimidiata, coriacea, postice longe decurrens, pallide fulva; pileo demum rigido, zonato, radiato-rugoso, lineato, margine acuto; poris hexagonis, dentatis, parvis.

On dead wood. Teffé (*Traill,* no. 134).

An inch or more across, decurrent and attached behind; pileus with a few pale zones, marked with radiating raised lines and ridges; pores about $\frac{1}{50}$ in. across; edge of dissepiments thin and toothed.

Somewhat resembling on a small scale *H. rigida,* B., in which, however, the pores are $\frac{1}{12}$ inch across, and their margin quite entire.

272. H. leprodes, *Fr.*

On dead wood. Igarapé de Marapata. Rio Negro, Dec. 30, 1874 (*Traill*).

Traill's No. 10 is apparently a resupinate form of *H. leprodes,* Fr., a species from Costa Rica.

273. Favolus Sprucei, *Berk. in Hook. Journ.* (1856) 237, t. v. f. 8.

On dead wood. Rio Negro (*Spruce,* no. 117).

274. F. brasiliensis, *Fr. Epic.* i. 498; *Berk. Hook. Lond. Journ.* ii. (1843) 638.

On rotten trunk. Minas (*Gardner*). Rio Tapajos (*Traill,* no. 132).

275. F. tessulatus, *Mont. Syll.* p. 171.

On dead wood. Rio Mauhes, May 1, 1874 (*Traill,* no. 133).

276. F. multiplex, *Lév. Ann. Sci. Nat.* 1844, ii. 203.

On dead wood. Lago Cerrado; Rio Jurua (*Traill,* no. 63).

277. F. alutaceus, *Berk. & Mont. Ann. des Sci. Nat.* 1849.

On branches. Bahia (*Blanchet*).

278. Gleoporus conchoides, *Mont. Syll.* p. 173; *Cuba,* t. 15. f. 1.

On dead wood. Rio Mauhes, below the rapids, May 1, 1874 (*Traill,* no. 80).

Pure white.

279. Porothelium (Pleuropus) rugosum, *Berk. in Hook. Journ.* (1856) 237, t. ix. f. 2.

On decayed trunks. Panuré (*Spruce,* no. 44).

280. ? Fistulina rosea, *Mont. Ann. des Sci. Nat.* sér. 4, v. 371.
On rotten wood. Brazil (*Wedd.*).

281. Hydnum flavum, *Swartz.*
On dead wood (*Traill*, no. 131).

282. H. (Resupinatum) dissitum, *B. & Cooke.* Orbiculare, secernibile, pallidum, margine brevi, byssoideo; aculeis acutis basi latioribus, interstitiis tomentosis.
On dead wood. Camana. Dec. 4, 1874 (*Traill*, nos. 76, 94).
Orbicular 1–1½ in. in diameter, at length laterally confluent, pinkish grey, margin short, byssoid; prickles scattered, acute, attenuated; interstices tomentose.

283. Irpex Sprucei, *Berk. in Hook. Journ.* (1856) 238.
On the ground. Panuré (*Spruce*).

284. Grammothele polygramma, *B. & C. Cuban Fungi*, no. 360.
Brazil (*M. J. B.*).

285. Craterellus rugiceps, *B. & Cooke.* Minutus, pileo flabelliformi, luteo, sicco rugosissimo; stipite brevi cum pileo confluente; hymenio lævi, cinnabarino.
On bamboo. Rio Solimões (*Traill*, no. 27).
Pileus 3–4 lines across, yellow, densely rugose when dry, flabelliform, confluent with the very short stem, which is dilated upwards, hymenium quite even, spores globose. Allied to *C. spathularia*, B. & C. Cuba, no. 367.

286. Cladoderris dendritica, *Pers. Freyc. Voy.* 176; *Berk. in Hook. Journ.* (1856) 273.
On decaying roots of *Alpinia.* Panuré (*Spruce*, no. 81). On wood. Uruçaca, Rio Jurua, Oct. 30, 1874 (*Traill*, no. 9, 112).

287. Thelephora caperata, *Berk. & Mont. Ann. des Sci. Nat.* 1849, 241.
On trunks. Bahia (*Blanchet*).

288. T. pilosiuscula, *Mont. Ann. des Sci. Nat.* sér. 4, v. 371.
On rotten trunks. Brazil (*Wedd.*).

289. T. subclavæformis, *Berk. in Hook. Journ.* (1856) 238.
On the ground. Panuré (*Spruce*).

290. T. ocreata, *Berk. in Hook. Journ.* (1856) 239.
Amongst dead leaves. Panuré (*Spruce*, no. 11).

291. T. trachodes, *Berk. in Hook. Journ.* (1856) 239.
On the ground. Panuré (*Spruce*, no. 153).

292. T. actiniæformis, *Berk. in Hook. Journ.* (1856) 239.
Rio Negro (*Spruce*, no. 155).

293. **Thelephora prolifera**, *Berk. in Hook. Journ.* (1856) 272.
On roots of trees. Rio Negro (*Spruce*, no. 17).

294. **Lachnocladium brasiliense**, *Lév. Ann. Sci. Nat.* (1846) 159.
Brazil (*Lév.*).

295. **L. furcellatum**, *Lév. Ann. Sci. Nat.* (1846) 159.—Clavaria furcellata, *Berk. in Hook. Journ.* (1856) 275.
Brazil (*M. J. B.*); Para, Mar. 6, 1875 (*Traill*, no. 128); Panuré (*Spruce*).

296. **L. reticulatum**, *B. & Cooke.* Dichotomum, ramis divaricato-reticulatis, stipite brevissimo.
On the ground. Rio Jurua, Nov. 17, 1874 (*Traill*, no. 127).
Forming tufts scarcely an inch high, stem very short, ¼ inch high, branched dichotomously at once.

297. **L. tubulosum**, *Lév.* (Clavaria tubulosa), *Fr. Ep.* i. 576; *Berk. in Hook. Journ.* (1856) 275.
Panuré (*Spruce*, no. 158).

298. **Stereum (Mesopus) hydrophorum**, *Berk. in Hook. Journ.* (1856) 273, t. vi.
On the ground. Rio Uaupés (*Spruce*, no. 80).

299. **S. cyathiforme**, *Fr. Ep* 545; *Berk. in Hook. Lond. Journ.* ii. (1843) 638.
Goyaz (*Gardner*).

300. **S. (Mesopus) elegans**, *Fr. Epic.* i. 545; *Berk. in Hook. Journ.* (1856) 273.
On trunks. Panuré (*Spruce*, nos. 174, 13); Rio Purus (*Traill*, no. 87).

301. **S. (Mesopus) nitidulum**, *Berk. in Hook. Lond. Journ.* ii. (1843) 638.
On rotten sticks. Goyaz (*Gardner*).

302. **S. (Mesopus) elevatum**, *B. & Cooke.* Pileo cyathiformi, zonato, castaneo, subtiliter velutino; stipite elongato, irregulari, rugoso, pulverulento; hymenio striatulo, leviter zonato, pallido.
On dead wood. Rio Jurua (*Traill*, no. 130).
Pileus 1 inch across, ¾ inch high, zoned, chestnut, minutely velvety, stem 4 inches high, ¼ inch thick, dilated and grooved at the apex, where it becomes of a deep bay, more umber below.

303. **S. (Mesopus) alutaceum**, *B. & Cooke.* Pusillum, cæspitosum, alutaceum; pileo infundibuliformi, lineato-striato, stipite gracili.
On dead wood. Rio Mauhes, below rapids (*Traill*, no. 49).
About half an inch high including the stem, buff, infundibuliform, finely striate, stem ¾ inch high, slender, dilated above into the pileus.

304. **S. (Mesopus) Ravenelii**, *B. & C.*
On dead wood. Obydos, Feb. 1874 (*Traill*, nos. 41, 42, 44).

305. Stereum (Pleuropus) nephrodes, *Mont. Ann. des Sci. Nat.* sér. 4, v. 371.
On trunks. Brazil (*Wedd.*).

306. S. (Pleuropus) obliquum, *M. & B.*
On dead wood. Lago Cerrado, Rio Jurua, Oct. 30, 1874 (*Traill,* nos. 46, 48).

307. S. (Pleuropus) fissum, *Berk. in Hook. Journ. Bot.* (1856) 273.
On dead twigs. Panuré (*Spruce,* no. 27).

308. S. (Pleuropus) partitum, *B. & Br., Ceylon,* no. 588.
On dead wood (*Traill,* no. 162). Trombetas.

309. S. (Pleuropus) spathulatum, *Berk. in Hook. Journ. Bot.* (1856) 274.
On wood. Rio Negro (*Spruce,* no. 175).

310. S. papyrinum, *Mont. Cub.* 374.
Brazil (*M. J. B.*).

311. S. melaleucum, *Mont. Ann. des Sci. Nat.* sér. 4, v. 371.
On trunks. Brazil (*Wedd.*).

312. S. lobatum, *Kze. Berk. in Hook. Journ.* (1856) 274.
On sticks. Para (*Traill,* no. 103); Rio Negro (*Spruce,* no. 69).

313. S. Sprucei, *B. Cuban Fungi,* no. 395.
River Amazon (*Spruce*).

314. S. Galeottii, *Berk. in Hook. Journ.* (1851) 15.
Caripi (*Spruce*); Vera Cruz (*Galeotti*); Xalapa (*Harries*).

315. S. striatum, *Fr.*
On sticks. Para (*Traill,* no. 104).

316. S. scytale, *Berk. in Hook. Journ.* (1854) 170.
Brazil (*M. J. B.*).

317. S. (Resupinatum) alliciens, *B. & Cooke.* Resupinatum, arcte adnatum, læte ochraceum, glaberrimum, læve; margine angustissimo, pallidiore, tomentoso.
On sticks. San Antonio da boa vista, Rio Javary (*Traill,* no. 1).
Forming patches some inches long, originally orbicular bright ochre, very smooth, even; margin very narrow, paler, tomentose.

318. Hymenochæte damæcornis, *Lév. Ann. Sci. Nat.* 1846; *Berk. & Curt. Fungi Cub.*; *Hook. Journ.* (1856) 273.—Stereum damæcorne, *Fr. Ep.* i. 546.
On decayed trunks. Brazil (*M. J. B.*); Panuré (*Spruce,* no. 24).

319. H. reniforme, *Fr. Ep.* i. 546; *Berk. in Hook. Journ.* (1856) 273; *Fr. Nova Symb.* 93.
On the ground. Rio Negro (*Spruce,* no. 25); Brazil (*Fries*).

320. Hypolyssus Montagnei, *Berk. in Hook. Journ.* (1851) p. 16, vol. i. p. 139, t. 6. fig. 1, (1856) p. 274.
On twigs. Caripi (*Spruce*); Panuré (*Spruce*, no. 70).

321. Dictyonema membranaceum, *Ag. Berk. in Hook. Journ.* (1851) p. 16.
Caripi (*Spruce*).

322. D. sericeum, *Mont. Bél. Voy.* 155; *Berk. in Hook. Lond. Journ.* ii. (1843) 639 (*Gardner*).

323. Hypochnus nigrocinctus, *Ehr. Hor. Phys. Ber.* 85; *Berk. in Hook. Journ.* (1851) 16.
Caripi (*Spruce*).

324. H. rubrocinctus, *Ehr. Hor. Phys. Ber.* p. 85; *Berk. & Curt. Cub. Fungi*, no. 456.
Brazil (*M. J. B.*).

325. H. albocinctus, *Mont. Ann. des Sci. Nat.* viii. 361; *Berk. in Hook. Journ.* (1851) 16.
Caripi (*Spruce*).

326. Guepinia spathularia, *Fr. Ep.* i. 566; *Berk. & Curt. Cuban Fungi*, no. 449.
Brazil (*M. J. B.*); Obydos (*Traill*, 40).

327. G. fissa, *Berk. in Hook. Journ.* (1856) 275.
On dead wood. Panuré (*Spruce*).

328. G. dilatata, *Berk. in Hook. Journ.* (1856) 274, t. x. f. 4.
On wood. Panuré (*Spruce*, no. 82).

329. Laschia tremellosa, *Fr. in Linn.* v. 533; *Berk. in Hook. Journ.* (1856) 237.
On dead trunks. Panuré (*Spruce*, no. 83).

330. L. reticulatam, *B. & Cooke*. Omnino sessilis, conchiformis, translucens; pileo reticulato, poris hexagonis.
On dead wood. Juruapuca, Oct. 28, 1874 (*Traill*, no. 47).
Pileus $\frac{1}{8}$ inch across, pores about $\frac{1}{60}$ inch, substance so thin as to make the pileus regularly reticulate from the translucence of the dissepiments.

331. Auricularia lobata, *Fr. Epic.* i. 555; *Berk. in Hook. Journ.* (1856) 274.
On dead wood. Panuré (*Spruce*, no. 12).

332. Clavaria delicia, *Berk. in Hook. Journ.* (1856) 274.
On dead leaves &c. Panuré (*Spruce*, no. 161).

333. C. cirrhata, *Berk. in Hook. Journ.* (1856) 275, t. v. f. 5.
On the ground. Rio Negro (*Spruce*).

334. **Clavaria dealbata,** *Berk. in Hook. Journ.* (1856) 275.
On the ground. Panuré (*Spruce,* no. 159).

335. C. **connata,** *Berk. in Hook. Journ.* (1856) 275.
On shady ground. Panuré (*Spruce,* no. 10).

336. C. **crispula,** *Fr. Ep.* 576; *Berk. in Hook. Journ.* (1856) 276.
Panuré (*Spruce,* no. 160, 162).

337. C. **Sprucei,** *Berk. in Hook. Journ.* (1856) 276.
On decayed trunks. Panuré (*Spruce,* no. 26).

338. C. **panurensis,** *Berk. in Hook. Journ.* (1856) 276.
On the ground. Panuré (*Spruce,* no. 156).

339. C. **fusco-lilacina,** *Berk. in Hook. Journ.* (1856) 276.
On sandy ground. Panuré (*Spruce,* no. 152).

340. C. **subulata,** *B. & Cooke.*
Simplex, insititia, filiformis, subulata, subtiliter pruinosa.
On the midrib of dead leaves. Rio Jurua (*Traill,* no. 172).
About half an inch high, filiform, rather translucent, pale umber when dry, sprinkled with minute white meal.

341. C. **verpiformis,** *B. & Cooke.*
Minuta, alba; stipite brevissimo, basi dilatata; capitulo glanduliformi-rugoso.
On dead bark. Rio Jurua (*Traill,* no. 180).
Very minute, about a line high, white; stem short, cylindrical, dilated at the base; head acorn-shaped, resembling that of some *Verpa* in miniature.

342. C. **scabra,** *Berk. in Hook. Journ.* (1856) 276.
On the ground. Panuré (*Spruce,* no. 157).

343. C. **cornea,** *Fr.*
On decayed wood. Barreiras de Jutahy Rio Solimões (*Traill,* no. 168).

344. C. **rubra,** *B. & Cooke.*
Læte rubra, furcata, apicibus acutis; stipite deorsum attenuato.
In forests on logs. Trombetas (*Traill,* no. 25).
About 1½ inch high, magenta-red, stem ¼ inch, attenuated below, forked twice, tips acute.

345. **Typhula Traillii,** *B. & Cooke.*
Translucens, firma; stipite elongato; capitulo oblongo.
On vascular bundles of *Attalea compta.* Rio Madeira (*Traill,* no. 174).
A larger species than *T. gyrans,* and apparently much firmer; the colour in the dried specimens is yellow; but the original colour was probably white. There is a small *Pistillaria* on twigs (Rio Jurua, *Traill,* no. 171); but without notes it cannot safely be distinguished.

346. Pterula plumosa, *Fr.*; *Berk. in Hook. Journ.* ii. (1843) 642.

Clay banks. Maranham (*Gardner*).

347. Tremella fuciformis, *Berk. in Hook. Journ.* (1856) 277.

On trunks. Panuré (*Spruce*, no. 9).

348. T. lutescens, *Fr. Ep.* p. 588; *Berk. in Hook. Journ.* (1856) 277.

On trunks. Panuré (*Spruce*, no. 151).

349. T. pulvinulus, *B. & Cooke.* Gregaria, pallide lutea, parva, pulviniformis, demum confluens.

On dead wood. Rio Purus (*Traill*, no. 164).

About 1 line in diameter, cushion-shaped, at length confluent, pale yellow; conidia very minute.

350. Hirneola protracta, *Lév.* (*sub* Exidia), *Ann. Sci. Nat.* Oct. 1844, p. 218; *Berk. in Hook. Journ.* (1856) 277.

On dead wood. Panuré (*Spruce*, no. 84).

351. H. auriformis, *Fr. Fungi Nat.* p. 26; *Berk. & Curt. Cúb. Fungi.*

Brazil (*M. J. B.*).

352. H. polytricha, *Fr. Fungi Nat.* p. 26.

(Exidia polytricha, *Mont.*)

Brazil (*M. J. B.*).

353. H. hispidula, *B. Ann. Nat. Hist.* iii. 396.

Urupa, Rio Mauhes (*Traill*, no. 167).

354. H. auricula judæ, *Fr.*—Exidia auricula Judæ, *Berk. in Hook. Journ.* (1856) 277.

On half-decayed trunks. Panuré (*Spruce*, no. 18); Rio Purua (*Traill*).

355. H. eximia, *B. & Cooke.* Pusilla; pileo tenui, orbiculari, lobato; margine ciliato; stipite gracili, deorsum incrassato hispidulo.

On dead wood. Lago Cerrado, Rio Jurua, Oct. 30, 1874 (*Traill*, no. 28).

Pileus about $\frac{1}{2}$ inch across below; margin ciliated; stem $\frac{1}{2}$ inch high, hispid, dilated downwards, springing from an orbicular hispid disk.

356. Nematelia corticola, *B. & Cooke.* Parva, pallide aurantiaca, erumpens, e basi plana candida oriunda.

On stringy bark. Rio Purua (*Traill*, no. 165).

Bursting through the bark from a white flat base, pale orange, very soft; spores oblong-elliptic $\frac{1}{750}$ inch long, $\frac{1}{1500}$–$\frac{1}{2000}$ inch broad. On the same matrix deep violet spots occur which stain the spores of the same colour. They look at first sight most like *Corticium cæruleum*, but are probably of animal origin.

357. Cycloderma Weddellii, *Mont. Ann. des Sci. Nat.* sér. 4, v. 373.

Brazil.

358. CYATHUS MONTAGNEI, *Tul. Ann. Sci. Nat.* (1844) 70; *Berk. & Curt. Cub. Fungi.*
Brazil (*M. J. B.*).

359. C. MICROSPORUS, *Tul. l. c.* p. 73.
Rio Janeiro (*Tul.*).

360. C. LIMBATUS, *Tul. Ann. Sci. Nat.* 1844, sér. 3, i. 78; *Berk. in Hook. Journ.* (1856) 278.
On semiputrid *Alpinia*. Panuré (*Spruce,* no. 148); *Traill* (nos. 38, 68).

361. C. PLICATUS, *Tul.* (Nidularia plicata), *Fr. in Linn.* v. 553; *Berk. in Hook. Lond. Journ.* ii. (1843) 639.
On dry banks. Organ Mountains (*Gardner*).

362. GEASTER SACCATUS, *Fr. Sys.* iii. 16; *Berk. & Curt. Cub. Fungi.*
Brazil (*M. J. B.*).

363. G. FIMBRIATUS, *Fr. Syct. My.* iii. 16; *Berk. in Hook. Journ.* ii. (1843) 639.
Rio Janeiro (*Gardner*); Brazil (*Traill,* no. 34).

364. SCLERODERMA STELLATUM, *Berk. in Hook. Journ.* (1856) 278.
On the ground. Panuré (*Spruce*).

Traill's no. 45 (Rio Solimoes) is a *Lycoperdon* too young to determine.

365. LYCOPERDON ASTROCARYI, *B. & Cooke.* Sessile, globosum, brunneum, granulatum, capillitio sporisque lævibus pallide lilacinis.
On petioles of *Astrocaryum.* Pupanha (*Traill,* no. 20).
Globose, sessile, rough with brown granules ¼–½ inch in diameter; capillitium and globose even spores very pale lilac.

366. HIPPOPERDON CRUCIBULUM, *Mont. Ann. des Sci.* Feb. 1842; *Berk. in Hook. Journ.* ii. (1843) 640.
Minas (*Gardner*).

367. LYCOGALA EPIDENDRUM, *Fr. Sys. Myc.* iii. p. 80.
Rio Jurua (*Traill,* no. 31).

368. DIDYMIUM FARINACEUM, *Fr. Sys. Myc.* iii. 119.
On leaves. Resaca, Rio Jurua, Nov. 1874 (*Traill,* no. 37).

369. CRATERIUM LEUCOSTICTUM, *Fr. Sys. Myc.* iii. 151.
On dead leaves. Rio Purus (*Traill,* no. 169).

370. STEMONITIS FUSCA, *Roth*; *Fries, Sys. Myc.* iii. 157.
Rio Purus (*Traill,* no. 30).

371. ARCYRIA PUNICEA, *Pers. Fr. Sys. Myc.* iii. 177.
On rotten wood. Rio Jurua, Passumba (*Traill,* nos. 18, 33).

372. A. CINEREA, *Schum.*; *Fries, Sys. Myc.* iii. 180.
Rio Jurua (*Traill,* no. 32).

373. ASCHERSONIA CUBENSIS, *Berk. & Curt. Cuban Fungi,* no. 557.
Brazil (*M. J. B.*).

374. ASCHERSONIA OXYSPORA, *Berk. in Hook. Journ.* (1856) 278.
On dead leaves. San Carlos (*Spruce*).

375. CERATIUM HYDNOIDEUM, *A. & S.*
On decayed wood. Passumba, Nov. 5, 1874 (*Traill,* no. 163).

376. STILBUM STROMATICUM, *Berk. in Hook. Journ.* ii. (1843) 642.
On a rotten tree. Minas Geraes (*Gardner*).

377. MYCOGONE SPHÆROPHORA, *Berk. in Hook. Journ.* (1856) 278.
On gills of some Agaric. Rio Uaupés (*Spruce,* no. 96).

378. CLADOSPORIUM HERBARUM, *Link, Berk. in Hook. Journ.* ii. (1843).
On *Leuzites applanata.* Minas Geraes (*Gardner*).

379. ANTENNARIA PANNOSA, *Berk. in Hook. Journ.* ii. (1843) 640, t. xxiii. fig. 1.
On leaves of *Pogopetalum.* Prov. Goyaz (*Gardner*).

380. SPHÆRONEMA EPICECIDIUM, *Berk. in Hook. Kew Gard. Misc.* i. 291, t. x. B; *Hook. Journ.* (1851) 18.
On galls. Caripi (*Spruce*); Para (*Sir E. Home*).

381. ÆCIDIUM PALUSTRE, *Mont. Ann. des Sci. Nat.* sér. 4. v. 375.
On leaves of *Polygala.* Brazil.

382. PUCCINIA ARANJA, *Lév. Ann. des Sci. Nat.* sér. 3, iii. 69.
On leaves of *Araujia.* Brazil (*Lév.*).

383. TORRUBIA UNILATERALIS, *Tul. Fung. Carp.* iii. p. 18.
On *Formica* (*Traill,* no. 24).

384. T. SPHINGUM, *Tul. Fung. Carp.* iii. p. 12.—Isaria sphingum, *Schwein. Syn. Cat.* no. 1298.
On Orthopterous insects (*Traill,* no. 239). On Lepidoptera, São Paulo.

385. T. BICEPHALA, *Berk. in Hook. Journ.* (1856) 278 (*sub* Cordicipite).
Panuré (*Spruce*).

386. NECTRIA COCCINEA, *Fr.*
Apparently, but without fruit. Rio Purus (*Traill,* no. 179).

387. N. EPISPHÆRICA, *Fries, S. Myc.* ii. 454.
On *Xylaria clavus.* Villa Bella (*Traill,* no. 176).

388. SPHÆROSTILBE CINNABARINA, *Tul. Sel. Fung. Carp.* iii. 130.
On fruit of Tucuma (*Traill,* no. 19).

389. S. LATERITIA, *Berk. & Curt. Cuban Fungi,* no. 764.—Stilbum lateritium, *Berk. in Hook. Journ.* ii. (1843) 642.
On sticks. Brazil (*M. J. B.*); Maranham (*Gardner*).

390. XYLARIA GRAMMICA, *Lév. Ann. des Sci. Nat.* sér. 3, v. 256 (*sub* Sphæria).
On trunks. Bahia (*Blanchet*).

391. Xylaria allantoidea, *Berk. Ann. Nat. Hist.* (1839) 397.
Brazil (*M. J. B.*).

392. X. hyperythra, *Mont. Ann. des Sci. Nat.* 1840; *Berk. in Hook. Journ.* (1856) 279.
On decayed trunks. Panuré (*Spruce*, no. 143).

393. X. dealbata, *B. & C. Journ. Ac. Sci. Phil.* ii. 284; *Berk. in Hook. Journ.* (1856) 279.
On decayed trunks. Panuré (*Spruce*, no. 145).

394. X. pallida, *B. & Cooke.* Suberosa, claviformis, simplex, pallida. Clavula cylindracea, apice subacuminato; stipite gracili, ad basin discoideo; sporidiis cymbiformibus, fuscis.
On sticks. Papunha, Nov. 5, 1873 (*Traill*, no. 21).
About 1–1½ inch high, stem half the length, slender, dilated and discoid at the base, head cylindrical, usually acuminate at the apex, pallid ostiola punctiform, minute, black; sporidia ·015 × ·005 millim.

395. X. rhopaloides, *Kze. Weig. Exs.*; *Berk. in Hook. Journ.* (1856) 279.
On dead trunks. Panuré (*Spruce*, no. 76).

396. X. scopiformis, *Mont. Ann. Sci. Nat.* 1840, xiii. p. 349; *B. & C. Cuban Fungi*, no. 801.
On stumps (*Traill*, nos. 139, 150).
There are also several other *Xylariæ* in a barren state (nos. 137, 138, 140, 143, 146, 147, 148, 149, 155, 158) in the Traill collection.

397. X. inæqualis, *B. & C. Cuban Fungi*, no. 805.
On dead sticks. Rio Jurua (*Traill*, no. 144).

398. X. Guepini, *Fr. El.* ii. 58.
Brazil (*Fries*).

399. X. digitata, *Fr. Sys. Myc.* ii. 326.
Pussumba (*Traill*, nos. 145, 153).

400. X. polymorpha, *Pers. Syn.* p. 7; *Berk. in Hook. Journ.* (1856) 279.
On dead wood. Panuré (*Spruce*, nos. 141, 142, 144).

401. X. conocephala, *B. & C. Cuban Fungi*, no. 780.
On wood. Barcellos (*Traill*, no. 152).

402. X. hypoxylon, *Fr.* (Sphæria, *Ehr.*), *Berk. in Hook. Journ.* ii. (1843) 639.
Old wood. Goyaz (*Gardner*).

403. X. ianthino-velutina, *Mont. Syll.* p. 204.
On woody legumes. Obydos (*Traill*, no. 136).

404. X. filiformis, *A. & F. Consp.* p. 2.
On leaves (*Traill*, no. 159).

405. XYLARIA APEIBÆ, *Mont. Syll.* p. 205.
On fruit of Apeiba. Obydos (*Traill,* no. 156).

406. X. MARASMOIDES, *B. & Cooke.* Sparsa, stipite setaceo penetrante; capitulo globoso primum dealbato, dein secundum perithecia condita fisso.
On bark. Capana, Oct. 3, 1874 (*Traill,* no. 43). Stem scarcely ¼ inch high, slender, setiform, penetrating with a small collar at the apex; head ½ line in diameter, soon splitting up. A smaller species than *X. aristata,* from which it differs in the ostiola not being prominent and the whole head splitting up into separate frustules.

407. X. ABNORMIS, *Berk. in Hook. Journ.* (1856) no. 279.
On dead wood. Panuré (*Spruce*).

408. THAMNOMYCES FUCIFORMIS, *Berk. in Hook. Journ.* (1856) 280.
On decayed trunks. Panuré (*Spruce,* no. 150).

409. T. CHAMISSONIS, *Ehr. Hor. Phys. Ber.* 79, t. 17. f. 1; *Berk. in Hook. Journ.* (1851) 17.
Brazil (*Spruce*).

410. T. ROSTRATUS, *Mont. Ann. Sci. Nat.* 1840; *Berk. in Hook. Journ.* (1856) 280.
On rotten trunks. Panuré (*Spruce,* no. 163).

411. HYPOXYLON CLAVUS, *Fr. in Linn.* v. p. 543 (*sub* Sphæria); *Berk. in Hook. Journ.* (1856) 280.
On dead bark. Panuré (*Spruce*); Brazil (*M. J. B.*); Villa Bella (*Traill,* no. 175).

412. H. CŒNOPUS, *Mont. Cub.* p. 341; *Berk. & Curt. Cub. Fungi.*
Brazil (*M. J. B.*).

413. H. MICROPUS, *Fr. in Linn.* v. 542; *Berk. & Curt. Cub. Fungi.*
Brazil (*M. J. B.*).

414. H. WRIGHTII, *B. & C. Cuban Fungi,* no. 168.
On dead wood. (*Traill,* no. 16). No. 64 (*Traill*) is apparently an imperfect *Hypoxylon* with somewhat the habit of *Panus stypticus.*

415. H. OBOVATUM, *Mont., Berk. in Hook. Journ.* (1851) 17.
On bark. Caripi (*Spruce*).

416. H. LEPRIEURII, *Mont. Ann. des Sci. Nat.* i. 352; *Berk. in Hook. Journ.* (1851) 17.
On bark. Caripi (*Spruce*).

417. DOTHIDEA GRANULOSA, *Lév. Ann. des Sci. Nat.* sér. 3, v. 264.
On leaves of *Vohiria.* Brazil (*Vauthier*).

418. D MYRCIÆ, *Lév. Ann. des Sci. Nat.* sér. 3, v. 264.
On leaves of *Myrcia.* Brazil (*Claussen*).

419. SPHÆRIA COCCODES, *Lév. Ann. des Sci. Nat.* sér. 3, iii. 50.
On leaves of Leguminosæ. Brazil (*Lév.*).

420. SPHÆRELLA NITIDULA, *Lév. Ann. des Sci. Nat.* sér. 3, iii. 54.
On leaves of *Melastoma.* Brazil (*Lév.*).

421. CORDIERITES SPRUCEI, *Berk. in Hook. Journ.* (1856) 280, t. x. f. 5.
On decayed trunks. Panuré (*Spruce,* no. 85).

422. ASTERINA MELASTOMATIS, *Lév. Ann. des Sci. Nat.* sér. 3, iii. 59.
On leaves of *Melastoma.* Brazil (*Lév.*).

423. MICROPELTES MARGINATA, *Mont. Syll.* p. 245.
On palm-leaves. Upper Amazon (*Traill*).

424. M. APPLANATA, *Mont. Cuba,* p. 325; *Berk. in Hook. Journ.* (1851) 18.
Caripi (*Spruce*).

425. MELIOLA AMPHITRICHA, *Fr. El.* ii. p. 109.
On leaves of *Bactris.* Upper Amazon (*Traill*).

426. M. ? PENICILLATA, *Lév. Ann. des Sci. Nat.* sér. 3, v. 266.
On trunks. Brazil (*Dupré*).

427. PARMULARIA STYRACIS, *Lév. Ann. des Sci. Nat.* sér. 3, v. 287.
On leaves of *Styrax.* Brazil (*Claussen*).

428. DEPAZEA MAPPA, *Berk. in Hook. Journ.* (1851) 18, t. 1. f. 3.
On leaves of some unknown plant. Caripi (*Spruce*).

429. PEZIZA HINDSII, *B. in Hook. Journ. Bot.* 1842, p. 456.
Rio Purus (*Traill,* no. 84).

430. P. TRICHOLOMA, *Mont. Syll.* 184.
On rotten wood. Rio Janeiro (*Gaudichaud*).

431. P. (TAPESIA) HERPOTRICHA, *Berk. in Hook. Journ.* (1851) 16, t. 1. f. 2.
On living leaves. Caripi (*Spruce*).

432. P. (MOLLISIA) CINEREA, *Batsch. Berk. in Hook. Journ.* (1851) 16.
Tanau (*Spruce*).

433. P. (MOLLISIA) VINOSA, *A. & S. Consp.* p. 308.
On rotten wood (*Traill,* no. 177).

434. CHLOROSPLENIUM BRASILIENSE, *B. & Cooke.* Æruginosum, cupula turbinata demum expansa, stipite brevi æquali. Ascis cylindraceis (·045×·002 millim.); sporidiis linearibus (·003–·004 millim. longis); paraphysibus filiformibus.
On wood. Rio Tapajoz (*Traill,* no. 29).

Sporidia scarcely perfect, but apparently much smaller than in *C. æruginosum.* The matrix is not discoloured.

435. CENANGIUM BRASILIENSE, *Mont. Ann. des Sci. Nat.* sér. 4, v. 371.
On bark. Goyaz (*Wedd.*).

436. PHACIDIUM DENTATUM, *Kunze, Berk. in Hook. Journ.* (1851) 17.
Caripi (*Spruce*).

437. RHIZOMORPHA CORYNEPHORA, *Kunze in Weig. Exs.*; *Berk. in Hook. Journ.* (1856) 277.
S. Antonio de bon vista, Rio Javary (*Traill,* no. 173). Panuré (*Spruce,* no. 149). Traill's no. 22 is also a *Rhizomorpha.*

On the Glandular Bodies on *Acacia sphærocephala* and *Cecropia peltata* serving as food for Ants. With an Appendix on the Nectar-glands of the common Brake Fern, *Pteris Aquilina.*

By FRANCIS DARWIN, M.B., F.L.S.

[Read June 1, 1876.]

(PLATE VI.)

THESE structures were discovered by Mr. Belt; and the part which they play in the economy of the plant is described in his delightful book*, from which the following description is taken.

Fig. 1 (Pl. VI.) represents a small branch of *Acacia sphærocephala*; at the base of the petiole is seen a pair of sharp curved spines, *h h*, from which the tree receives its name of the Bull's-horn Thorn. These spines are hollow and are inhabited by ants; and at certain seasons hundreds of the colonists may be seen running about over the young leaves, passing in and out of their nest through an aperture made at the base of the spine. The ants form a standing army for the tree, and not only prevent cattle &c. browsing on it, but also protect it from the ravages of the leaf-cutting ants. So serious is the latter danger, that the tree is actually unable to exist without its guard of colonists. To ensure the presence of ants about the young leaves two attractions are offered by the *Acacia*:—first the nectar secreted by a crater-formed gland situated at the base of the petiole, and shown at *g g* in fig. 1;

---

* 'The Naturalist in Nicaragua,' 1874, p. 218.

secondly, a little golden pear-shaped body developed at the extremities of some of the leaflets of the bipinnate leaf. In the enlarged drawing, fig. 2, the general aspect of the pear-shaped bodies is seen. I have ventured to rename these structures (the rations served out to the standing army of ants) *food-bodies*, including under this term the analogous structures in *Cecropia* immediately to be described.

A few months ago my father received a letter from Herr Fritz Müller, the well-known naturalist, residing at St. Catharina, in Brazil; this letter was published in 'Nature,' Feb. 17, 1876, p. 304. Fritz Müller shows that the ants inhabiting the hollow stems of a *Cecropia* mentioned by Mr. Belt are supplied with food-bodies analogous to those of the *Acacia*. Here the food-bodies are not developed on the tips of the leaflets, but at the base of the petiole of the leaf, on its underside, emerging, as Fritz Müller says, like asparagus from a bed, out of the cushion of hairs which clothe the pulvinus. The sweet liquid for the ants is not supplied by glands, but by the scale-insects kept by the ants in the hollow stem which forms the nest of the colony. Thus we have in *Cecropia* the same marvellous protection as in *Acacia*; moreover I hope to be able to show that not only are the food-bodies of these widely distinct plants histologically identical, but that they are actually homologous one with the other—though one is an appendage to the leaves, the other a growth from the pulvinus.

Herr Fritz Müller had informed my father that he intended to publish an account of the *Cecropia*; and through the courtesy of Dr. Hermann Müller and his son, I was enabled to see a copy *in extenso* of Fritz Müller's forthcoming paper. As he does not enter into the minute structure of the food-bodies, it seemed worth while to attempt its investigation; this I have been fortunate enough to be able to do through the kindness of Dr. Hooker, who has placed living plants of both the *Acacia* and the *Cecropia* at my disposal. I have worked chiefly at the food-bodies of *Acacia*, as being easier to manipulate, and also because I learn from Dr. H. Müller that Prof. Strasburger, of Jena, will probably describe those of *Cecropia*.

ACACIA SPHÆROCEPHALA.—The leaf is bipinnate and about 9 or 10 centims. in length; it springs from the base of the gigantic pair of thorns, and bears a minute spine at its upper end. The food-bodies are developed on the six or seven lower pairs of leaflets; they are about 2 millims. in length, and are shaped like a pear with one side much flattened. Longitudinal sections examined with a low power show that the food-body is made up of cellular tissue continuous with that of the leaf and included within the epidermis. The cells are somewhat elongated, those at the base giving in section a fairly rectangular outline (·064 × ·016 millim.); in transverse sections the cells appear nearly circular in outline. A fibro-vascular bundle, continuous with the midrib of the leaf, runs for a considerable distance into the food-bodies, *e. g.* for ·6 or ·77 of their length, and terminates blindly in a few short bifurcations of the spiral vessel.

Methods employed.—Hardly any thing need be said on this head; the food-bodies are of such a consistence as to allow of sections being cut in the usual way. I have found it convenient to colour the embedding material pink with alkanet, for the sake of the contrast of colour with the pale yellow food-body. The various reagents used will be detailed in the sequel.

Minute structure.—Examined with a high power, the cells are found to contain a granular protoplasmic body, in which strongly refracting oil-globules are embedded. There is a spherical nucleus ·0064 millim. in diameter, staining brightly in carmine, aniline, &c. In some preparations the protoplasm lies free in the cell-cavity; in others it fills it entirely. It is of a firm texture, and may often be seen floating out in a mass from a ruptured cell. It exhibits the following reactions characteristic of protoplasm:—

1. It takes a deep yellow colour with iodine.

2. It assumes a fine rose tint on being placed in strong sulphuric acid after having been soaked in syrup.

3. Strong nitric acid and subsequent treatment with a solution of caustic potash give the yellow colour of xanthoprotein.

The metaplasmic particles which give it a granular appearance are removed by potash or acetic acid; under this treatment the protoplasm clears up, and the oil is well shown; fig. 3 represents a section in this condition.

The oil, which is seen to consist of globules of various sizes, gives the following reactions:—

1. It is soluble in ether, absolute alcohol, and in a mixture of turpentine and creasote, and is not soluble in water or glycerine.

2. It is coloured green by strong sulphuric acid*.

---

* This test has been applied to oils by Heydenreich and Penot, see Dict. of Chemistry, Watts, iv. p. 182.

3. Tincture of alkanet stains it bright pink*. It is not coloured by other staining fluids.]

The green colour with sulphuric acid is the only one of the above reactions which would show that the globules are oil and not resin; for Hanstein † mentions alkanet as staining resin; but the fact that the ants search greedily after the food-bodies seems to show that they are oleaginous.

Relation between the Oil and the Protoplasm.—Sections cleared with caustic potash show plainly that the oil is embedded as separate drops in the protoplasm; and similar sections from which the oil has been dissolved with ether &c. exhibit the cavities in which the oil is thus contained. The matrix may be stained with alkanet; and one then sees the crimson protoplasm pierced in all directions by smooth-walled cavities corresponding with the oil globules seen in the potash specimens, fig. 3. Sections stained rather less brightly and from which the oil has not been removed, show a pretty contrast between the bright crimson oil drops and the less brilliant matrix. Where the oil is in the form of a number of very minute drops of equal size, the protoplasmic matrix (as seen in thin sections cleared with potash and with creasote) exhibits a delicate network, as shown in fig. 4.

It may be of interest to note that the food-bodies of *Acacia* partially resemble in structure some other forms of nutriment-stores in the vegetable kingdom. It appears that the crater glands and the food-bodies together supply nutriment sufficient to support the ants; it is therefore evident that the latter must be considered in the light of protein stores as well as of stores of carbohydrates. We may compare them *analogically* with the endosperm of seeds, in which these substances are also stored. Now in some seeds the oil is found as drops in the cavities of a protoplasmic matrix, just as in the food-bodies; possibly also the (proteinaceous ?) granules in the protoplasm of the food-bodies may be compared to aleurone grains.

Homologies and Development.—In the adult state the upper leaflets terminate in minute points, ·1 millim. in length. They appear to be embryonic structures; for they are relatively well developed in a very early stage of growth, and as the leaf grows they remain stationary and shrivel away. If we examine an extremely young leaf, we find that all the leaflets, both upper and lower, terminate in constricted points composed of cells differing slightly in appearance from those of the rest of the leaflet; now, although the points on the lower leaflets which are destined to become food-bodies soon outgrow those on the upper ones, yet there can be no doubt that they are morphologically identical with one another. Food-bodies are usually developed on the six or seven lower pairs of leaflets; but sometimes, by an arrest of development, one of these terminates in a simple point hardly larger than those on the upper leaflets. This is seen in fig. 2, where *p* ought normally to have grown into a body like f^3. In accordance with the principle of compensation of growth, the leaf is frequently dwarfed in correspondence with the development of the food-bodies, as for instance at f^1 in fig. 2; occasionally the leaf proper is quite aborted, and the food-body is attached to the petiole simply by a minute stalk. The question next arises, With what structures in other plants are these points homologous? If we imagine the bipinnate leaf of the *Acacia* converted into a pinnate leaf by the coalescence of the pinnæ, the tips of the old pinnæ will become the teeth of the new *serrated* pinnæ. Now, withered tips are found on the points of the serrations of many leaves; and Reinke has shown that such points are the remains of glands which are highly developed at a very young stage of growth, and die off as the leaf grows*. I conclude therefore that the food-bodies are homologous with the serration-glands of Reinke.

---

* This is the test for oils mentioned by Sachs.

† Bot. Zeit. 1868, p. 708.

Development of the oil.—In the youngest condition in which I have been able to examine the leaflets, *i. e.* when the food-bodies are only ·05 millim. in length, no oil is visible; there is merely a cell-sap cavity surrounded by yellowish protoplasm. I cannot be certain at what age the oil first appears; in food-bodies a little over a millimetre in length (a full-grown one measuring about 2 millims.) a considerable quantity of oil was found. In these specimens there was a cavity in the cell which contained no oil; nor were its walls smooth and rounded like those of the cavities in which oil is embedded in a protoplasmic matrix, but showed rather a jagged outline. This cavity of course diminishes in size as oil is developed in larger quantities in the protoplasm enclosing it; possibly oil globules may escape into it like a secretion into a duct.

In sections taken from a young food-body about a millimetre in length, the protoplasm enclosing each cell-cavity is seen to contain embedded in it a row of spherical bodies; they are about ·0032 millim. in diameter, and of a dingy yellow colour. As the oil is formed they disappear; but their pigment, no doubt, gives the golden tint to the young food-bodies, and its subsequent absorption causes the change to dull white observable in the older ones. There can be no doubt that they are chlorophyll-bodies which have never developed beyond their early yellow stage; and, from the manner in which the oil takes their place, I believe that they are actually converted into that substance. This phenomenon is not abnormal; for oil is formed in the chlorophyll-bodies of *Allium cepa**. Again, chlorophyll-bodies may be absolutely converted into what should be normally a contained product, as in the case of the starch-grains mentioned by Sachs†. It is not meant that all the oil is produced by the transformation of chlorophyll; it is doubtless also secreted as droplets in the protoplasm. Indeed the latter mode of formation is far more in accordance with the supposition that the food-bodies were originally glandular; for Hanstein‡ has shown that most resins and balsams are secreted as minute drops in a vacuolated protoplasm of the gland-cell. It also corresponds with the formation of animal secretions, *e. g.* of the oil in the sebaceous-gland cells. On the other hand, the transformation of the chlorophyll into oil may perhaps correspond with another form of secretion of the same substance in the animal kingdom, viz. in the mammary gland. In his paper§ on the mamma, Dr. Creighton shows that the formation of fat in a mammary cell is essentially a process of endogenous cell-formation, the old cell giving birth to a new protoplasmic mass which is entirely converted into oil. Now, in reference to the origin of chlorophyll-bodies, Sachs remarks‖, "it can to some extent be compared to the process of free-cell formation;" so that if I am right in supposing that the chlorophyll is transformed into oil, it will agree with the formation of the fatty part of milk, in its essential feature of being a cell-formation. At the risk of appearing fanciful I may note that the colostrum, or first milk, is yellow from hæmoglobin, the respiratory pigment of animal life; and in the same way the young food-bodies are coloured yellow, the respiratory pigment of plant-life.

---

* Göttingen Nachrichten, 1873, p. 825.

---

* Sachs, 'Physiologie Végétale,' p. 354.

† 'A Text-Book of Botany,' Eng. translat. p. 49.

‡ Bot. Zeit. 1868, No. 43.

§ Reports of the Medical Officer to the Privy Council, 1875, No. vi. p. 171.

‖ 'A Text-Book of Botany,' Eng. translat. p. 48.

The nectar-gland.—The gland which secretes the nectar is situated at the base of the petiole; in form it somewhat resembles a flat thorn, such as those on roses with the top cut off. The gland is shown in *g g* in fig. 1. Its profile outline is there seen to be something like that of a volcanic mountain; and it very well deserves the name of "crater-formed" gland, applied to it by Mr. Belt. The crater is a long narrow trough running along the ridge-like summit of the gland; and into this trough the nectar wells up from the subjacent secreting tissue; in my plant the secretion was so abundant as to drip on to the floor of the hot-house. The gland, which projects about 2 millims. above the surface of the petiole, has a curious look of having been thrust into a cleft in the stalk of the leaf; this arises from the fact that the stalk is traversed by a longitudinal groove, and that it is from the base of this groove that the gland arises as an excrescence; and as it grows up between the walls of the groove, it seems to come through a split in the petiole.

In transverse sections perpendicular to the axis of the petiole it may be seen that the epidermis of the gland is continuous with that of the stalk, also that fibro-vascular bundles run up on each side of the central mass of glandular tissue. The latter is flask-shaped in transverse section, the neck terminating above in the crater, and the body resting on the upper surface of the petiole. The glandular tissue is made of loose elongated cells, which are bilaterally symmetrical about a central line, from which they radiate outwards and downwards.

Cecropia peltata (*the Imbauba tree*).—I have already quoted enough from Fritz Müller's interesting paper to explain the relations existing between this tree and its army of ants. The following is his account of the food-bodies. At the base of the leaf-stalk is a flat cushion, which is raised about 1 millim. above the surrounding parts, and embraces fully one half of the leaf-stalk. While this cushion is protected by the ensheathing ocrea it is white, but becomes brown on exposure to the air. This cushion is absent on young plants, and also on the first leaves of small branches. As the leaf develops, the cushion appears as a white shining silky patch of projecting unicellular hairs; among these spring up crowded multicellular hairs which soon outnumber the simple ones. The former attain a length of 1 millim., and consist of about twelve cells, the lower ones being cylindrical, the upper spherical or egg-shaped, giving a moniliform appearance to the hair, which terminates above in a sharp point. When the sheath of the leaf is nearly open, pestle-shaped bodies develop in the cushion; they are from ·8 to 1 millim. in length, and from ·3 to ·5 in breadth; the free end is rounded; and the point of greatest thickness takes various positions; so that they may be either egg-shaped, cylindrical, or pear-shaped. When ripe they are milk-white and rather translucent; on drying they become yellowish and shrink somewhat. As they ripen they project beyond the hairs. They now break off at the slightest touch, and ultimately fall out spontaneously. The growth of fresh bodies continues for several weeks; and on an Imbauba tree that has not been visited by ants, as many as sixty or a hundred food-bodies may be seen projecting from the cushion. F. Müller also gives an interesting account of the ant army gathering its harvest; he carried home with him a branch inhabited by a small colony, hardly numbering a hundred. He removed the sheath from a pulvinus, so that from fifty to a hundred fresh food-bodies were exposed. The harvest was discovered almost immediately, and each ant seized one of the little bodies with its mandibles and dragged it off to the nest. The looser bodies were easily disposed of; but those which were somewhat more firmly attached, cost much time and trouble, and were only loosened by a great deal of pulling to this side and that. In ten or fifteen minutes, only four food-bodies were left; and on these various ants had in vain tried their strength. Fritz Müller supposes that the cushion protects the food-bodies from drought, and from the too early visits of the ants. Is it not possible that it may serve to protect the young bodies from the ravages of slugs? The most watchful ant-sentinel cannot be expected to guard against the night attack of such an enemy; but the cushion of sharp hairs would certainly keep off soft-bodied creatures, acting in the same way as the cinders on a flower-bed.

Minute structure.—The food-bodies of *Cecropia* are composed of a mass of cells continuous with the parenchyma of the pulvinus and included within the epidermis. They do not include any fibro-vascular bundles. The manner in which nutriment is stored in the cells of the food-bodies of *Cecropia* is essentially the same as that already described in the case of the Bull's-horn Thorn; that is to say, the cells contain a very granular protoplasm, in which are embedded numerous drops of oil. I have not worked at this tissue with all the same care which I gave to the study of the *Acacia*. But as far as my work goes, I know of no essential feature by which a food-storing cell of *Cecropia* can be distinguished from the similar cells of the *Acacia*.

Development.—By cutting sections perpendicular to the free surface of the young pulvinus, food-bodies in various stages of growth are included in the preparations. The youngest condition in which I have found these structures is that of slight excrescences above the surface, included within the epidermis, and formed of cells differing in shape and in their granular aspect from the ordinary chlorophyll-bearing parenchyma-cells of the pulvinus. This condition of things is shown in fig. 5. These excrescences increase in size, projecting as dome-like masses, and gradually assume the characters of food-bodies.

It is this method of development which induces me to believe that the food-bodies of *Cecropia*, like those of *Acacia*, are of glandular origin; for it corresponds with the mode of growth of other glands—for instance, those of *Dictamnus fraxinella* (Sachs, 'Handbook,' p. 114). I am aware that what I have said must seem but slender evidence of the glandular nature of the food-bodies of *Cecropia*; it is, however, the only view of their homologies which I have been able to form.

If the view here advocated be the correct one, it completes in a curious way the parallel between *Acacia* and *Cecropia*; moreover it renders the whole case more intelligible from the evolution stand-point. It is probable that the food-bodies of *Acacia* were originally glands whose function, like that of the serration-glands of Reinke, was to lubricate the young leaves. But even granting this, it is not easy to make out the steps by which they could be converted into stores of nutriment. I believe that a possible explanation may be found in an observation of Reinke's. He noticed that the glands on the footstalks of *Prunus avium* (which, from their position, must correspond with serration-glands) secreted nectar, and that the glands on the two or three lower teeth of the leaf *occasionally* produced nectar instead of their normal secretion (resin). Why, therefore, should not the glands in which the food-bodies presumably took their origin have suffered a similar change, so that oil was formed in the cells instead of sugar or resin? The storing of a product instead of its elimination from a cell is not an essential point of difference between the two cases. Moreover the ants may have commenced a habit of visiting, and probably of protecting, the tree when the glands were in an excretory stage of development; for we know that the nectar-glands on Passion-flowers, according to Mr. Belt*, serve to attract the small black ants who guard the tree from other creatures.

APPENDIX.—*On the Nectar-glands of the Common Brake Fern* (PTERIS AQUILINA).

Since reading the paper to which the present remarks are appended, an observation has been made which, apart from some interest of its own, has a direct bearing on my views as to the origin of food-bodies.

On June 5th I noticed the presence of smooth green prominences at the base of the fronds of the common Brake Fern. Further examination showed them to be secreting glands, producing a sweetish fluid which exudes from their surfaces. The glands are busily visited by more than one kind of ant, especially by *Myrmica*; they are also attractive to *Elater* and another kind of beetle. The gland is well developed while the fern is still very young, and it ceases to secrete when the plant becomes mature. The glands are shown in fig. 6 at *g g*, the latter being merely seen in profile. In the young state the gland is a fairly conspicuous triangular prominence, standing out clearly from the pubescent surface of the plant. As each frond is fully developed, the gland at its base becomes gradually flattened, and ceases to be so conspicuous. I have not yet been able to examine the minute structure of the glands.

The glands have a remarkable power of secreting rapidly. The following observations on this point were made by my father.

June 8th. "Examined several ferns with *Myrmica* on them, and found the glands quite dry. Brushed off the ants, and in from 5 to 6 minutes distinct drops of secretion were formed." On the same day he repeated the observation, and found that the drops of secretion were, as before, reproduced in 6 minutes.

The method adopted by the ants to obtain the nectar is in accordance with this high rate of secretion; they may usually be found seated patiently on the glands, evidently sucking up the secretion at fast as it is produced. In many glands shallow excavations are found which appear to have been gnawed; and this is probably the work of the ants. If this be so, it has an interesting bearing on *Cecropia*. I have already expressed the opinion that the food-bodies of this plant aboriginally existed as secreting glands, and that by the retention of the secretion they were developed into food-bodies. Now in the fern we have an intermediate stage, a true secreting gland, which is, at the same time, gnawed. If in this case the secretion were to be retained, the gnawing would be probably continued, and the glands would thus be converted into rudimentary food-bodies.

---

* *Loc. cit.* p. 224.

The existence of the secretion in the fern is also of interest in another way. I believe that the food-bodies of the Bull's-horn *Acacia* are developed from embryonal glands at the tips of the leaflets. I was convinced that those of *Cecropia* are likewise homologous with glands; but I was unable to hear of any case in which such structures are situated at the base of a petiole or branch. The fern shows us that a secreting gland may be found in such a situation. In Delpino's paper on Extra-floral Secreting Organs * there is no mention of the glands of *Pteris Aquilina*, nor, indeed, any allusion to the production of a sweet fluid by any cryptogamous plant. It is probable therefore that the functional significance of this organ has not been noticed. In the same paper Delpino states his view that whenever a sweet fluid is secreted elsewhere than in the floral nectaries, it serves as a protection to the plant by attracting ants, which keep other creatures away, just as occurs with the Bull's-horn *Acacia*, and the Passion-flower mentioned by Mr. Belt †. The fact that the fern secretes a sweet fluid seems strongly opposed to such a view; for this plant is singularly free from enemies, not being eaten by the larger animals, by rodents, or by grasshoppers.

In the fern the secretion of a sweet liquid is decidedly connected with the growth of the young fronds; for it ceases when they are mature. Again, the honey-like fluid on the stipules of *Vicia sativa* has been shown by my father to be secreted only while the sun shines on them. It appears that, in these cases, the secretions are dependent on the continuance of active vital or chemical changes in their immediate neighbourhood. They seem, in fact, to be of the nature of excretions, waste products utilized as food by the ants in the same way that the sweet excretion of the Aphis is made use of by them.

---

* Bullettino Entomologico, 1874.

† *Loc. cit.*

DESCRIPTION OF PLATE VI.

Fig. 1. A small branch of *Acacia sphærocephala*, natural size: *h, h, h*, the hollow thorns; *g, g*, the nectar-secreting glands.

2. Part of a leaflet of *Acacia* (× 5·7): f^1, f^2, f^3, the three lower food-bodies on one side; *p* the dwarfed point of the upper leaflet corresponding to f^3.
3. Transverse section of food-body of *Acacia*, treated with solution of potash to show the oil globules. (Hartnack No. 8.)
4. The same, treated also with creasote and turpentine (Hartnack No. 8) to remove the oil and show the protoplasmic matrix.
5. *Cecropia peltata*. Development of a food-body. (Hartnack camera lucida with objective No. 5.)
6. Young plant of common Brake Fern, *Pteris Aquilina*, showing the nectar-glands, g^1, g^2.

Lichens collected by W. Pool, Esq., in Madagascar.

By the Rev. J. M. Crombie, F.L.S.

[Read June 1, 1876.]

Judging from its climate and situation, there can be no doubt that the island of Madagascar possesses a very rich and extensive lichen-flora. Unfortunately, however, it is still in this respect almost entirely a *terra incognita*; nor does the present small collection throw much light upon its lichen treasures, though it affords some indications that these are both valuable and varied. No habitats are attached to the specimens, all of which were gathered near Antananarin, the capital of the island; but it may be presumed that they are entirely corticole.

Sphærophoron madagascareum, *Nyl.*, sp. n.

"Thallus albidus, erectus, compressiusculus (latit. fere 1 millim. vel angustior, crassit. 0·2 millim. vel etiam tenuior), dichotome divisus, evernioideus (altit. circiter 3 centimetrorum vel minor); apothecia primum in globulo thallino albo inclusa, deinde globulum nigrum nudum fingentia (latit. 0·5–0·7 millim.); sporæ 8næ, globosæ, diam. 0·004–0·005 millim. Species omnino distincta, nulli alii affinis."—*Nyl. in litt.*

The thallus is somewhat glaucescent above, and beneath more purely white. Occasionally, as in the other species of the genus, it is more or less tinged of a reddish or pink colour. From all of these, however, it differs very remarkably in the situation of the apothecia, which are not terminal on the apices of the primary axes, but scattered chiefly towards the extremities of the branches.

USNEA FLORIDA (*L.*), f. RUBIGINEA (*Mich.*).

The discoloration of the thallus in this state of the plant is entirely accidental, and owing either to the presence of ammonia in the atmosphere, or the urine of animals (*e.g.*, in arboreal habitats, of bats), or other similar causes.

U. XANTHOPOGA, *Nyl. in MS. ut* sp. n.

This species was formerly known to occur only in the Campbell Islands, where it was gathered by M. Filhol. The specimens are barren.

U. XANTHOPOGA, f. RUBIGINESCENS.

This state is entirely analogous to f. *rubiginea* of the preceding species, and is owing to the same causes.

PARMELIA PERLATA, var. CILIATA, *Schær.*

Infertile.

STICTINA MOUGEOTIANA (*Del.*).

Very sparingly, and sterile.

S. UMBAVILLARIA (*Bor.*), var. PAPYRINA, *Nyl.*

Only a single small specimen, but well fruited.

S. RETIGERA, *Ach.*

Fertile.

S. DAMÆCORNIS (*Sw.*).

Sparingly, but fertile.

S. PLUMBEA, *Del.*, *Nyl.* (vide *Nyl. Syn.* p. 357).

A smaller state, but otherwise sufficiently typical and fertile.

S. VARIABILIS, *Bor.*

Only a small and barren fragment.

S. AURATA, *Ach.*

Infertile, and with paler thallus.

RICASOLIA DISSECTA (*Ach.*), *Nyl.*

In the absence of fructification (only a single apothecium not rightly developed being present), the specimen (otherwise incomplete) cannot be positively determined. If in reality, as it would appear, referable to this species as a smaller form (f. *minor*), it is interesting to have its geographical range thus extended from equinoctial America to Africa.

PHYSCIA FLAVICANS (*Sw.*).

Infertile.

P. LEUCOMELA, var. ANGUSTIFOLIA, *Mey. & Flot.*

Typical but sterile.

On a Collection of Ferns made by Mr. William Pool in the interior of Madagascar. By J. G. Baker, F.L.S.

[Read June 1, 1876.]

Mr. William Pool, a gentleman largely engaged in building-operations in Antananarivo, has this spring returned temporarily to England, and brought with him and presented to the Kew Herbarium the very interesting collection of Ferns which is the subject of the present paper. As we know so little upon the botany of the interior of Madagascar, I give a complete catalogue of the species which he has gathered, describing only the novelties. The numbers prefixed to these latter indicate the place in which they fall in the sequence of species followed in our 'Synopsis Filicum.'

34*. Cyathea appendiculata, *Baker*, n. sp. Fronds ample, bipinnate. Fertile pinnæ lanceolate, 6–9 in. long, 18–21 lines broad; their pinnules subsessile, only a few of the uppermost adnate, the others free, but not petioled, lanceolate, faintly crenate, ¼ in. broad, obtuse, auricled on the upper side at the base. Rachises pale brown or castaneous, entirely naked on the lower side, pilose on the upper. Veins distinct, close, those of the lower part of the pinnules 2–3-furcate, those of the auricle pinnate. Sori in rows close to the midrib of the lower part of the pinnæ. Involucre large, glabrous, breaking up irregularly. It bears also from the crown of the caudex decompound oblong-oblanceolate dimorphous pinnæ, like those of *Hemitelia capensis*, with linear-subulate divaricating segments ⅛–¼ in. long.

It resembles closely in cutting, texture, and veining some of the forms of *C. canaliculata*, which is a Madagascar species, but differs by its free pinnules, auricled on the upper side at the base, and by having the remarkably fine dimorphic pinnæ just described, which occur also in *C. decrescens*, a tripinnate species gathered in Madagascar by Boivin.

34*. C. quadrata, *Baker*, n. sp. Fronds ample, bipinnate. Fertile pinnæ lanceolate, 9–12 in. long, 18–21 lines broad. Pinnules free, except the uppermost, just as in *C. appendiculata*, ligulate, obtuse, ⅙ in. broad, not auricled at the base, sessile, or the lowest shortly petioled, distinctly crenated, with square lobes. Texture subcoriaceous. Both surfaces green, the upper one glabrous, the lower slightly pilose and the edge ciliated. Rachises dull brown, those of the pinnæ subglabrous on the lower side, densely tomentose on the upper. Veins distinct, 15 to 18 on each side in the fully-developed pinnules, the upper ones simple, the lower forked. Sori in long rows close to the midrib. Involucre large, fragile, breaking up irregularly. Receptacle pilose.

This, again, is closely allied to *C. canaliculata*, but differs by its quadrately-crenate free pinnules and pilose under surface.

33*. **Cyathea discolor**, *Baker*, n. sp. Fronds ample, tripinnate. Pinnæ oblong-lanceolate, 1–1½ foot long, 7–8 inches broad. Pinnules lanceolate, sessile, the fully-developed ones 3½–4 inches long, ⅝–¾ in. broad, cut down to the rachis into close, adnate, ligulate, obtuse lobes $\frac{1}{12}$ in. broad, subentire, or the lowest crenated. Texture membranous. Upper surface green, naked; lower white, with a few scattered scales on the ribs. Rachises pale brown, tomentose above, naked below with a few scattered linear paleæ. Veins of developed tertiary segments 9–10-jugate, fine, not raised, the lower ones deeply forked or even trifid, the upper ones simple. Sori small, costular, confined to the lower half or third of the segments. Involucre membranous, persistent, breaking up irregularly. Receptacle naked.

Reminds one strongly of the well-known New-Zealand *C. dealbata*; but the white is much deader, the texture less coriaceous, and the involucre larger and deeper.

Hemitelia Melleri, *Baker?*

Only doubtful on account of the absence of fruit.

64*. **Alsophila bullata**, *Baker*, n. sp. Frond ample, tripinnate. Pinnæ oblong-lanceolate, 15–18 in. long, 6–7 inches broad. Pinnules lanceolate, subsessile, 3–4 in. long, ¾–⅞ in. broad, cut down to the rachis into crenate, patent, ligulate, obtuse tertiary segments ⅛ in. broad, the lower ones free, with a space equal to their breadth between them, the upper ones adnate and closer. Texture membranous. Both surfaces green. Rachis of the pinnæ dull brown, scabrous with minute furfuraceous brown scales; of the pinnules tomentose above, of the pinnules and tertiary segments below densely clothed with minute bullate scales. Veins 6–8-jugate in the tertiary segments, one to each lobe, erecto-patent, deeply forked. Sori about 15 to a segment, minute, placed at the forking of the veins rather nearer the midrib than the edge. Receptacle densely pilose.

A well-marked species, recognizable amidst the crowd of tripinnate Alsophilas by its deeply crenated tertiary segments and copious minute bullate scales of the ultimate rachises.

64*. **Alsophila vestita**, *Baker*, n. sp. Frond ample, tripinnate. Pinnæ oblong-lanceolate, 12–15 in. long, 4–5 in. broad. Pinnules lanceolate, ½–⅝ in. broad, cut down to the rachis into close ligulate obtuse, distinctly crenated tertiary segments ⅛ in. broad, the lower ones free but sessile, the upper ones adnate. Texture moderately firm; both surfaces green. Rachis of the pinnæ full brown, clothed with dense short tomentum above, and abundant minute scales beneath; and those of the pinnules and segments also densely scaly. Veins of the tertiary segments 6–8-jugate, forked. Sori large, costular, crowded, filling up the whole of the segments except the tips and very edge. Receptacle densely paraphysate.

Most like the South-American *A. paleolata*. Only three Alsophilas were known in Africa previously, and none in Madagascar.

HYMENOPHYLLUM CILIATUM, *Sw.*

H. POLYANTHOS, *Sw.*

34*. **H. POOLII**, *Baker*, n. sp. Rhizome thread-like, wide-creeping. Stipe 1½–3 in. long, filiform, thinly beset with fine spreading hairs. Frond lanceolate, 2–3-pinnatifid, 3–5 in. long, ¾–⅞ in. broad. Pinnæ sessile, rhomboid, erecto-patent, ¼ in. broad, cuneate-truncate on the lower side at the base, cut down to a distinct wing into close, ligulate, erecto-patent, one-nerved segments ⅛–⅙ in. long. ⅓ line broad, only the lowest anterior ones in the most fully developed pinnæ forked. Texture very thin, delicate, and elastic. Hairs on the edge and ribs abundant, often conspicuously stellate. Main rachis filiform at the base, winged above the middle. Sori many to a pinna, terminal. Valves of the involucre hemispherical, densely pilose.

Most like the slender varieties of *H. subtilissimum*, but the frond different in shape, and the secondary segments much longer and fewer.

TRICHOMANES QUERCIFOLIUM, *Hook. & Grev.*

T. PYXIDIFERUM, *L.*

T. RADICANS, var. **T. GIGANTEUM**, *Bory.*

DICKSONIA HENRIETTÆ, *Baker.*

A fine suite of specimens of this, which was published in the second edition of 'Synopsis Filicum,' from a single small example sent by my relative Miss Henrietta Baker. Some of Mr. Pool's specimens are 4-pinnate, with pinnæ above a foot long and half a foot broad.

DAVALLIA THECIFERA, *H. B. & K.*

D. ELEGANS, *Sw.*

D. TENUIFOLIA, *Sw.*

D. FERRUGINEA, *Desv.*

Davallia Goudotiana, *Kunze*.

This and the last are little-known endemic Madagascar species.

71*. D. (**Stenoloma**) **flabellifolia**, *Baker*, n. sp. Stipe castaneous, naked. Frond deltoid, half a foot long and broad, 3–4-pinnatifid. Pinnæ lanceolate, the lowest the largest, and produced on the lower side, the others equilateral. Ultimate divisions flabellate, the fan with a short-winged petiole, the lower half cuneate and entire, the upper cut into 4–6 one-nerved ligulate segments $\frac{1}{12}$–$\frac{1}{8}$ in. broad, which are widest at the tip. Texture chartaceous. Both surfaces bright green, and quite free from hairs or scales. Sori terminal on the segments, round or transversely oblong, the deltoid tip of the segment just overtopping them. Valve of the involucre reniform, membranous, naked, persistent, free at the sides.

About midway between *D. bifida* and *tenuifolia*.

Adiantum æthiopicum, *Linn*.

Pellæa calomelanos, *Link*.

Hypolepis anthriscifolia, *Presl*.

Lonchitis madagascarica, *Hook*.

Mr. Pool's fine specimens show, I think, conclusively that this is distinct specifically from *L. pubescens*. They are fully 3-pinnate, with lanceolate-deltoid pinnæ above a foot long, the pinnules, except the highest, distinctly petioled, and the oblong fully developed tertiary segments not at all adnate to the rachis, which is never the case in the many forms of *L. pubescens*. The texture is chartaceous, and both surfaces bright green and nearly naked.

1*. L. **polypus**, *Baker*, n. sp. Frond ample, fully tripinnate. Pinnæ lanceolate-deltoid, reaching a length of 2 feet and a breadth of 8–9 inches. Pinnules lanceolate. Lowest tertiary segments lanceolate-deltoid, distinctly petioled, acute, with shallow obtuse round lobes. Texture as in *L. pubescens*. Lower surface and rachises clothed with short rusty tomentum. Veining and sori of *L. pubescens*.

Pteris madagascarica, *Agardh*.

And a probable new species, of which the specimens are not complete enough to describe, midway between this and *P. quadriaurita*.

P. **quadriaurita**, *Retz*.

P. **biaurita**, *Linn*.

29*. P. **macrodon**, *Baker*, n. sp. Stipe 6–9 in. long, glossy, naked, bright chestnut-brown. Frond subdeltoid, bipinnate, 6–9 in. long, 4–5 in. broad. Many upper pinnæ simple, central lanceolate; lowest largest, subdeltoid, with lowest pinnule on lower side sometimes deltoid and more or less pinnatifid. Ultimate segments ligulate-oblong, cuneate at the base, $\frac{1}{2}$–1 in. long, 2–4 lines broad, deeply toothed at the barren tip. Texture membranous. Both surfaces naked and bright green, the main rachis castaneous. Veins fine, distinct, erecto-patent, all except the uppermost forked. Sori running from the top of the cuneate base to within a short distance of the tip of the segments. Involucre pale, broad, persistent, glabrous.

Very distinct. Most like the West-Indian *Pteris heterophylla*, Linn.

P. PEDATA, *Linn.*

A variety with free veining.

P. LANCEÆFOLIA, *Agardh.*

63*. **P. (LITOBROCHIA) PLATYODON**, *Baker*, n. sp. Stipe (broken away) grey-stramineous, naked, as is the rachis. Frond rhomboid-deltoid, a foot long by rather less broad, simply pinnate. Pinnæ below the large caudate pinnatifid tip 5–6 on a side, linear, the upper ones adnate, the lower shortly petioled, half a foot long, an inch broad, irregularly repand with deltoid obtuse teeth that sometimes reach halfway down to the rachis, and an acuminate entire tip. Texture subcoriaceous. Both surfaces green and naked. Veins fine, distinct, anastomosing in copious, often pentagonal, areolæ without any free included veinlets. Sori continuous from the base nearly to the tip of the pinnæ following the undulations. Involucre narrow, firm, persistent, glabrous, very distinct.

LOMARIA ATTENUATA, *Willd.* var. **HETEROPHYLLA**.

L. BORYANA, *Willd.*

L. PUBESCENS, *Baker*, n. sp. Fronds dimorphic, barren oblanceolate, 12–15 in. long, 2–3 in. broad at the middle, narrowed to both ends, its grey puberulent stipe 2–3 in. long, cut down to a very narrow wing into close lanceolate denticulate pinnæ $\frac{3}{8}$ inch broad, the central ones 1–1$\frac{1}{2}$ inch long, the lowest obtuse and little longer than broad. Texture membranous. Both surfaces deep green, the lower one, and especially the slender grey-stramineous rachis, finely pilose. Veins distinct, erecto-patent, forked. Fertile frond pinnate with distant ligulate-subulate erecto-patent pinnæ 1–3 inches long, $\frac{1}{12}$ inch broad. Most like the Australian *L. lanceolata*, but pilose.

L. PUNCTULATA, *Kunze.*

L. PROCERA, *Spreng.*

31*. **L. BIFORMIS**, *Baker*, n. sp. Rhizome thick, woody, creeping or suberect, densely clothed with small brown linear scales. Barren frond with a very short stipe, lanceolate, bipinnate, 6–12 inches long, 2–2½ inches broad at the middle, narrowed to both ends. Pinnæ lanceolate, sessile, patulous, the central ones 1–1½ inch long, ¼ inch broad, the tip entire, the lowest part cut down to the costa into close ligulate one-nerved pinnules ½ line broad. Texture moderately firm. Both surfaces green, naked. Veins usually simple, sometimes forked in the segments. Fertile fronds simply pinnate, with distant narrow ligulate pinnæ, varying from ½–2 inches long, with a 1–4 inch stipe, furnished with distantly placed very minute auricles.

The only species previously known with a bipinnate sterile and simply pinnate fertile frond is *L. diversifolia* of New Caledonia.

Asplenium nidus, *Linn.*

A. Sandersoni, *Hook.*

A. Trichomanes, *Linn.* (viviparous).

50*. **A. Poolii**, *Baker*, n. sp. Stipe naked, green, 4–6 inches long. Lamina rhomboid, 8–16 inches long, 3–6 inches broad, simply pinnate. Pinnæ 3–11, the end one the largest, often viviparous at the tip, linear, 3–6 inches long, ⅜–⅝ inch broad, crenated, acuminate, erecto-patent, subequally cuneate at the base, all except the uppermost shortly petioled. Texture membranous. Both surfaces and rachis dark green and glabrous. Veins lax, distant, erecto-patent, forked. Sori linear or, in forms with narrow pinnæ, oblong, ⅛–½ inch long, medial, not touching either edge or midrib. Involucre pale, glabrous, ⅓ line broad.

Near the East-Indian *A. Wightianum*, but pinnæ only obscurely crenate.

A. anisophyllum, *Kunze.*

A. lunulatum, *Sw.*

A. hirtum, *Kaulf.*

A. dimidiatum, *Sw.* A variety with petioles ¼–½ inch long to the pinnæ.

A. serra, *L. & F.*

A. resectum, *Sm.*

A. protensum, *Schrad.*

A. affine, *Sw.*

Running into a series of curious dareoid forms, as *A. lineatum* does in Bourbon.

A. auritum, *Sw.*

A. furçatum, *Thunb.*

A. brachypteron, *Kunze.*

A. Mannii, *Hook.*

A third station for this very curious and distinct little plant, known before on the Cameroons and in Zambesi-land.

Asplenium Thunbergii, *Kunze*. Just like the Cape specimens, but doubtless merely a dareoid variety of *A. lunulatum*.

A. (Athyrium) nigripes, *Blume*. Known before in Asia only. There is also in the collection a form midway between *nigripes* and *Filix-fœmina*; but these *Athyria* are so difficult that I do not venture to take it up as new.

A. (Diplazium) sylvaticum, *Presl.*

A. (Diplazium) arborescens, *Mett.*

251*. A. (Diplazium) madagascariense, *Baker*, n. sp. Frond ample, tripinnatifid. Pinnæ lanceolate. Pinnules lanceolate, the lowest 15–18 inches long, ½ inch broad, pinnatifid ½–⅓ of the way down to the rachis into ascending obtuse lobes ⅛ inch broad. Texture membranous. Both surfaces bright green, naked. Veinlets of tertiary lobes 2–3-jugate, erecto-patent, simple. Sori copiously diplazioid, reaching from the base of the vein two thirds of the way up. Diplazioid sori ¼ line broad. Nearest *Diplazium comorense*, Bojer; but that has much larger sessile pinnules, veins of the tertiary segments 5–6-jugate, and sori and involucre not more than half as broad.

251*, A. (Diplazium) nemorale, *Baker*, n. sp. Frond ample, tripinnatifid. Pinnæ lanceolate, a foot long. Pinnules lanceolate, with a petiolule ⅛–⅙ inch long, an inch broad at the base, narrowed gradually to the tip, cut down to broad wing into oblong obtuse entire lobes ⅓–¼ inch broad. Veins pinnate in the tertiary segments, with 5–6-jugate erecto-patent forked veinlets. Sori copiously diplazioid, reaching from the base of the vein two thirds of the way up.

Near the last. Remarkable for the very distinct petiolules of its pinnules.

A. aculeatum, *Sw.*

A. capense, *Willd.*

A. falcatum, *Sw.*

Didymochlæna lunulata, *Desv.* A form with segments cut on the upper side into rounded lobes as deep as broad.

5*. Nephrodium (Lastrea) parallelum, *Baker*. Stipe slender, naked, filiform, 1½–2 inches long. Frond lanceolate, simply pinnate, 5–6 inches long, 1¼–1½ inch broad. Main rachis filiform, winged only at the very top. Pinnæ 9–10 pairs below the deltoid pinnatifid tip, sessile, lanceolate-deltoid, cut away on the lower side at the base, distinctly crenated, ⅜–½ inch broad, the lower ones gradually reduced. Texture membranous. Both surfaces green, naked. Veins pinnate opposite each lobe, with 2–3 erecto-patent simple veinlets on a side. Sori in a single row rather nearer the midrib than the margin of each pinna. Involucre minute, brown, reniform, glabrous, very distinct.

NEPHRODIUM (LASTREA) ALBO-PUNCTATUM, *Desv.*

N. (LASTREA) CRINITUM, *Desv.* Type and a bipinnate variety with free lanceolate pinnules deeply crenated, with veins forked in the upper and subpinnate in the lower lobes, which contain 2–4 sori. This bears the same relation to the type that *N. elongatum* bears to *Filix-mas*; and it is the only instance where one of the bipinnatifid simple-veined *Lastreæ* runs into such a condition.

N. (LASTREA) FILIX-MAS, *Rich.* type and var. ELONGATUM.

10*. N. (LASTREA) FIBRILLOSUM, *Baker*, n. sp. Rhizome not seen. Stipe 3–4 inches long, clothed like the rachis with spreading linear-subulate dark brown scales $\frac{1}{8}$ inch long. Frond oblong-lanceolate, $1\frac{1}{2}$ foot long, 9-10 inches broad, simply pinnate. Central and lower pinnæ subequal, shortly petioled, spreading, linear-lanceolate, caudate-acuminate, $4–4\frac{1}{2}$ inches long, $\frac{3}{4}$ inch broad, cut about a third of the way down to the rachis into close oblong obtuse lobes. Veins 5–6-jugate, ascending, all simple, the lowest pair not reaching the sinus, but not anastomosing with those of the next lobe, the next pair carried up to the sinus. Texture membranous. Both surfaces green and quite naked. Sori medial on the veins. Involucre minute, fugacious.

Habit most like that of *N. truncatum*, but the veins free and and rachis conspicuously scaly.

45*. N. (LASTREA) SEWELLII, *Baker*, n. sp. Stipe grey, pilose, 2–3 inches long. Frond oblong-lanceolate, 8–9 inches long, $3–3\frac{1}{2}$ inches broad at the middle, narrowed gradually to both ends. Pinnæ lanceolate, sessile, 12–13-jugate below the pinnatifid tip, the central ones 18–21 lines long, 6–7 lines broad, cut down to a broad wing into oblong obtuse entire lobes $\frac{1}{8}$–$\frac{1}{6}$ inch broad; lower pinnæ gradually smaller and more and more reflexing, the lowest deltoid. Texture membranous. Both surfaces green and finely pubescent, as is also the slender grey rachis. Veins 6–8-jugate in the secondary segments, erecto-patent, simple. Sori supra-medial on the veins, with a minute fugácious involucre.

Nearest *N. tomentosum* and some of the American forms of *N. conterminum*, Hook.

N. (LASTREA) CATOPTERON, *Hook.*

N. (LASTREA) BOIVINI, *Baker*. A good series of this, an endemic species, described in edition 2 of 'Synopsis Filicum.'

N. (EUNEPHRODIUM) MOLLE, *Desv.*

N. (EUNEPHRODIUM) UNITUM, *R. Br.*

N. (EUNEPHRODIUM) n. sp. next PENNIGERUM? Not complete enough to describe. Pinnæ very like those of *N. pennigerum*, but sori smaller and costular.

NEPHROLEPIS ACUTA, *Presl.*

OLEANDRA ARTICULATA, *Cav.*

POLYPODIUM SERRULATUM, *Mett.*

91*. P. POOLII, *Baker*, n. sp. Stipes tufted, ¼–½ inch long, densely clothed with spreading red-brown bristly hairs a line long. Frond simple, ligulate, 1½–2 inches long, ⅙ inch broad, narrowed gradually from the middle to a cuneate base, entire. Texture membranous. Both sides green, profusely clothed with fine red-brown spreading hairs like those of the stipe. Midrib flexuous; veins distant, immersed, arcuate-ascending, forked near the base, not reaching the edge. Sori round, superficial, ¾–1 line broad, terminal on the anterior fork of the veins, forming a row on each side of the midrib, medial between costa and margin.

Near *P. Sprucei* and *Hookeri.*

125*. P. SUBPINNATUM, *Baker*, n. sp. Stipes tufted, 1–1½ inch long, filiform, clothed with fine spreading soft red-brown hairs. Fronds pendulous, lanceolate, 3–7 inches long, 1–1½ inch broad, cut down to a narrow wing into lanceolate obtuse entire pinnæ 3–4 lines broad at base, the central ones the longest, those at both ends of the frond becoming gradually smaller, the lowest semicircular. Texture chartaceous. Both surfaces green, clothed with fine spreading claret-brown hairs. Veins fine, immersed. Midrib of pinnæ waved; veinlets forked above the base, not reaching the edge. Sori superficial, round, terminal on the anterior forks of the veins, so as to form a single row midway between midrib and edge; 10–12 to the central pinnæ.

Near *P. leucosum* and *villosissimum.*

P. RIGESCENS, *Bory.*

149*. P. DELTODON, *Baker*, n. sp. Stipe an inch long, wiry, black, curved, naked. Frond oblong-lanceolate, 3–4 inches long, 1–1½ inch broad, simply pinnate. Pinnæ 12–16 on a side, adnate, linear, acute, $\frac{1}{12}$ inch broad above the dilated base, furnished with large deltoid teeth, which sometimes reach halfway down to the rachis, a few of the lower pinnæ reduced in size. Texture chartaceous; both surfaces green, glabrous. Veins distant, simple or forked high up, erecto-patent. Sori round, superficial, marginal, terminal on the veins, half a line broad.

Near *P. repandulum* of India.

158*. P. DEVOLUTUM, *Baker*, n. sp. Stipes tufted, wiry, 3–4 inches long, clothed with short deciduous spreading claret-brown hairs.

Basal scales minute, bright brown, linear. Frond pendulous, lanceolate, simply pinnate, 6–10 inches long, 12–21 lines broad. Pinnæ entire, ligulate, linear, obtuse $\frac{1}{6}$ inch broad above the dilated base, a few of the lower ones reduced in size. Texture chartaceous, elastic. Both surfaces green, the lower thinly clothed with soft brown-purple hairs like those of the stipe. Veins obscure, immersed, forked. Sori superficial, globose, subcostular, reaching more than halfway to the edge, 20–30 to the central pinnæ.

Near *P. suspensum*, *melanopus*, and *celebicum*.

POLYPODIUM (NIPHOBOLUS) FISSUM, *Baker*. Only known previously in India and Java. There is also another *Niphobolus* in the collection, but in barren state only with coriaceous strap-shaped fronds 3–4 inches long, with broadly revolute edges, scarcely any stipe, a creeping woody rhizome clothed with dense small glossy castaneous linear scales, and loose ferruginous stellate tomentum.

P. (PHYMATODES) LYCOPODIOIDES, *L.*

P. (PHYMATODES) LANCEOLATUM, *Linn.*

P. (PHYMATODES) LINEARE, *Thunb.*

P. (PHYMATODES) BULLATUM, *Baker*, n. sp. Stipe broken away. Frond linear-lanceolate, entire, 12–15 inches long, an inch broad at the middle, narrowed gradually to both ends, acuminate, cuneate at the base. Texture membranous. Both surfaces green and quite naked. Veins distinct, anastomosing copiously in angular areolæ with free included veinlets. Sori round, uniserial, placed in a single row nearer the midrib than the edge, immersed so that their top is nearly level with the back of the frond; and they form large papillæ like those of *P. nigrescens* on the upper side.

Allied to *P. lineare* and *P. normale*.

P. (PHYMATODES) NORMALE, *Don*, var. MADAGASCARIENSE, *Baker*. Near the Cape *P. Pappei*, but lamina broader and sori more numerous. Stipe reaching a length of 4–5 inches. Frond 2–2½ inches broad at the middle. Sori subuniserial or scattered in 2–3 irregular rows over the central half or two thirds of the frond.

P. (PHYMATODES) IRIOIDES, *Lam.*

P. (PHYMATODES) PHYMATODES, *L.*

P. (DRYNARIA) WILLDENOVII, *Bory.*

GYMNOGRAMME JAVANICA, *Blume.*

New to the Mascarene Isles, but known in West Africa.

G. ARGENTEA. *Mett.*

G. ARGENTEA, var. AUREA, *Desv.*

A fine set of specimens of the Mascarene Gold and Silver Ferns.

G. (SELLIGUEA) LANCEOLATA, *Hook.*

ANTROPHYUM BORYANUM, *Kaulf.*

ACROSTICHUM CONFORME, *Sw.*

A. HYBRIDUM, *Bory.*

A. VISCOSUM, *Sw.*

Two varieties.

46*. A. SCHIZOLEPIS, *Baker*, n. sp. Caudex erect; stipes tufted, $\frac{1}{4}$-$\frac{3}{8}$ inch long. Barren frond oblanceolate, obtuse, $\frac{3}{4}$–$1\frac{1}{2}$ inch long, $\frac{1}{8}$-$\frac{1}{6}$ inch broad, entire, narrowed very gradually from the middle to the base, chartaceous, green on both sides, clothed moderately densely with pale brown scales, sliced down to the centre into stellate tufts of hair. Veins simple, immersed, erecto-patent. Fertile frond unknown.

Habit of some of the varieties of *A. spathulatum*, but paleæ like those of *A. auricomum*.

A. SQUAMOSUM, *Sw.*

Two varieties.

A. SPICATUM, *Linn.*

PLATYCERIUM MADAGASCARIENSE, *Baker*, n. sp. Fertile frond deltoid, about a foot high and nearly as broad, narrowed gradually from the top to the base, irregularly lobed along the upper margin, but the very numerous divisions all shallow and very irregular in shape, only the young fronds showing the elks-horn forking to a depth of 2 or 3 inches. Sorus extending over the whole of the upper two thirds of the lamina and reaching quite to the edges at the sides, but not quite to the tip of the segments of the upper border. Texture rigidly coriaceous. Upper surface bright green; lower in the barren part clothed with a thin coat of white tomentum. Veining as in *P. alcicorne* and *P. Stemmaria.*

We have also another undescribed Madagascar *Platycerium* (*P. Ellisii*, Baker, inedita), received from the Rev. W. Ellis, with shallowly forked narrow deltoid fronds green on both surfaces, and a sorus extending from edge to edge through the upper quarter.

LYGODIUM LANCEOLATUM, *Desv.*

MARATTIA FRAXINEA, *Smith.*

LYCOPODIUM PECTEN, *Baker*, n. sp. Habit entirely of *L. Selago.* Stems stiff, dichotomously forked, erect, 4 to 5 inches high, the ultimate branches 2–3 inches long, and, including leaves, $\frac{1}{8}$ inch thick.

Leaves ascending, densely imbricated all round the stem, falcate, rigid in texture, linear with a dilated base, $\frac{1}{10}$ inch long, cut down to a narrow midrib into a series of subulate teeth, the lower ones, ascending the upper ones squarrose. Sporangia copious, minute, in the axils of unmodified leaves. Perhaps the most distinct novelty of the whole collection, as no other *Lycopodium* with pectinate or divided leaves is known.

LYCOPODIUM COMPLANATUM, *Linn.*

This widely-spread species was not known before, either in Continental Africa or any of the islands of the Mascarene archipelago.

SELAGINELLA FISSIDENTOIDES, *Spring.*

S. SUBEROSA, *Spring.*

S. LÆVIGATA (*Lam.*), *Baker.*

The collection contains altogether 114 species, of which 28 prove to be novelties. That such should be the case in an Order where the diffusion of the species is so wide as in the Ferns is calculated to raise our expectation of what we may expect when the Flowering Plants of the same region are gathered; and it is interesting to notice that some of the species, such as *Asplenium Trichomanes*, *Nephrodium Filix-mas*, and *Aspidium aculeatum*, are thoroughly temperate types. The development of lamina in the species known elsewhere, and the strong tendency shown by many of them to become viviparous, indicates a damp humid climate with localities excellently suited for the development of fern-growth.

Habits of Filices observed about the Malvern Hills, near the Gorge of the Rakaia River, Canterbury, New Zealand. By T. H. Potts, Esq., F.L.S.

[Read June 15, 1876.]

CYATHEACEÆ.

Cyatheaceæ is feebly represented by genera *Hemitelia* and *Alsophila*.

HEMITELIA.

H. SMITHII.

Not common; trunk 4 to 5 feet high; fronds 4 to 6 feet long.

ALSOPHILA.

A. COLENSOI.

On ranges up to 2000 feet above sea-level; trunk prostrate, about 3 inches in diameter, 4 to 5 feet long.

HYMENOPHYLLACEÆ.

HYMENOPHYLLUM.

Several species of filmy ferns are to be found near banks of streams on rocks, less commonly on trees.

H. TUNBRIDGENSE.

This cosmopolitan affects dry banks of mellow yellowish loam on the edge of deep gullies in the bush; fronds very small.

H. MULTIFIDUM.

In thick masses on the ground, in *Fagus* forests, often matted with moss.

H. JAVANICUM.

Rare; on damp almost perpendicular rocks sprinkled with spray of falling water, often growing in moss with *P. grammitidis*; tufted, bright green, not shining; stipes very broadly winged to the base; frond 8 to 9 inches high.

H. POLYANTHOS.

In this district the most abundant of the genus; in damp weather diffusing a pleasant odour. On the ground, on rocks, roots, ascending, for a few feet only, the stems of trees. Frond 2 to 8 inches high.

H. DEMISSUM.

Not very common. On the ground; sometimes growing with *H. polyanthos*.

This fern, like *H. multifidum* and *H. polyanthos*, is much affected by atmospheric changes; damp weather sets it off to the greatest advantage; under the dry north-wester it becomes crisp and brittle.

POLYPODIACEÆ.

CYSTOPTERIS.

C. FRAGILIS.

This hardy fern grows under the shelter of stones and tussock grass on the steep terraces of the Rakaia river. Fronds 6 to 8 inches high.

ADIANTUM.

A. AFFINE.

Rare. On crevices of rocks in the gorge of the river Rakaia.

HYPOLEPIS.

H. TENUIFOLIA.

On damp flats in *Fagus* forests, or on the outskirts of bush often found freely rooting on decaying stumps of *Carex virgata*.

H. MILLEFOLIA.

On ranges. Most abundant, in some places forming large patches, under shelter of rocks.

PTERIS.

P. AQUILINA.

Weak-growing, depauperized; from 3 inches to 3 feet high.

P. INCISA.

In bush or about outskirts; not plentiful.

LOMARIA.

This large genus is well represented by abundance of plants, vigour of growth, variety of species.

L. PROCERA.

Abundant. Several varieties of the larger forms in the bush, on the banks of gullies. The smallest variety affects more open ground, as spurs of hills and moist undulating downs.

L. PLUVIATILIS.

Abounds near streams or creeks, on damp hill-sides sheltered by bush.

L. VULCANICA.

Commonly found on dry cob banks.

L. LANCEOLATA.

Sheltered by bush.

L. DISCOLOR.

One of the most common ferns in the district; of vigorous habit; stumps often 1 foot high, with fronds over 4 feet in length, densely covering the sides and bottoms of wide gullies in the bush; less abundant on the outskirts.

L. PATERSONI.

In some places abundant, often growing with *L. procera* under dripping rocks. In one part, in a large bush, it is, with *Aspidium aculeatum* and *Todea hymenophylloides*, amongst the most common ferns. Fronds above 3 feet long.

L. ALPINA.

In places in the open most abundant, forming large patches.

L. DUPLICATA, n. sp.

Under bush; abundant where found. Stipes of fertile fronds erect and much longer than those of barren fronds.

ASPLENIUM.

With the exception of a very few species, the extensive genus *Asplenium* is but indifferently represented in this district.

A. OBTUSATUM, var. LUCIDUM.

Not at all common; near shaded streams.

A. FLABELLIFOLIUM.

Abundant where crevices in rocks afford shelter.

A. HOOKERIANUM.

Plentiful on rocks about the chasms of the gorge. Fronds from 3 to 12 inches long.

A. BULBIFERUM.

Usually found about the sides of creeks or on damp bottoms in the bush.

A. RICHARDI.

Of vigorous habit. In crevices of rocks about the gorge.

A. COLENSOI.

Found in places that give much shelter, under overhanging rocks, under banks covered with a dense canopy of *Rubus australis*.

A. FLACCIDUM.

Abundant; growing from rocks and trees.

ASPIDIUM.

A. ACULEATUM.

In vigorous habit. Here it rivals *L. discolor*. It occupies very bleak positions; under favourable conditions it may be found crowning a stout woody rhizome about 2 feet high, with fronds measuring 5 feet in length.

A. RICHARDI.

Not nearly so common as the preceding species; found near creeks.

POLYPODIUM.

P. AUSTRALE.

On rocks, roots, dry banks. Common.

P. GRAMMITIDIS.

Not common. About wet rocks.

P. PUNCTATUM.

In *Fagus* forests on poor cob. It varies from 2 feet upwards. The writer got some in Rockwood bush measuring over 6 feet.

P. SERPENS.

About rocks and trees. Abundant.

P. BILLARDIERI.

Common. Densely clothing trees.

OSMUNDEÆ.

TODEA.

T. HYMENOPHYLLOIDES.

Plentiful in the most sheltered parts of the bush. Fronds of lighter green than those on specimens growing near the coast.

On the Digestive Ferment of *Nepenthes*. By S. H. Vines, B.A., Fellow of Christ's College, Cambridge. Communicated by W. T. Thiselton Dyer, M.A., F.L.S., Assistant Director, Royal Gardens, Kew.

[Read June 15, 1876.]

I.

The publication of Dr. Hooker's address at the Belfast Meeting of the British Association for the Advancement of Science (August 1874), and of Mr. Darwin's book on Insectivorous Plants, has given rise to several investigations into the nature of the phenomena described in those works. The questions at issue are these:—(1) as to whether the solution of the proteids therein described was effected by a process of true digestion; and (2) if so, what relation exists between the processes of digestion occurring in plants and those with which we are acquainted in animals.

The first attempt to answer these questions was made by Dr. Lawson Tait. In a paper read before the Birmingham Natural-History Society on June 17, 1875*, Dr. Tait announced that he had been able to separate a substance closely resembling pepsin from the secretion of *Drosera dichotoma*; and subsequently in 'Nature,' July 29, 1875, he stated that he had succeeded in obtaining a similar substance from the fluid taken from the pitchers of various species of *Nepenthes*. In some of its properties the substance obtained from *Drosera*, to which Dr. Tait gives the name Droserine, resembles pepsin, more especially in its solubility in glycerin. Unfortunately, however, Dr. Tait seems to have instituted no experiments which clearly prove that the substance which he had isolated was in fact a digestive ferment—as, for instance, a test of the digestive power of its glycerin solution on some proteid. Under these circumstances, the isolation of the ferment can hardly be regarded as an accomplished fact, especially as the chemical method adopted by Dr. Tait in his researches is not wholly satisfactory.

The next series of experiments on this subject with which I am acquainted are those of Riess and Will of Erlangen†, which were made upon *Drosera rotundifolia*. Their object was to show, if possible, that the leaves of this plant contained in their gland-cells a ferment similar in its properties to that which exists in the peptic glands of animals. Accordingly, they proceeded to treat the leaves of *Drosera* in the same way as the gastric mucous membrane of an animal is treated when it is desired to prepare from it a glycerin extract holding pepsin in solution, according to the method of Von Wittich; that is to say, they first treated the leaves with absolute alcohol for twenty-four hours, to remove as much water as possible from them, and then, after reducing them to pulp, allowed them to stand in glycerin. They then proceeded to test the digestive properties of this extract by placing in it some shreds of swollen-up fibrin (prepared after Grünhagen's* method) and acidifying it slightly with dilute hydrochloric acid. They found that at the end of eighteen hours, at a temperature of 40° C., the fibrin had entirely disappeared, and that the filtered liquid gave the characteristic peptone reaction when treated with caustic potash and dilute copper sulphate. At the same time they had carried on control-experiments with shreds of fibrin exposed in the one case to the unacidified extract, in the other to the dilute hydrochloric acid. In neither of these cases was the fibrin dissolved; nor did the filtered liquid give the peptone reaction.

---

* Abstracted in 'Nature,' July 29, 1875.

† Bot. Zeitung, Oct. 29, 1875, no. 44.

From these experiments it is evident that the leaves of *Drosera* contain a digestive ferment which resembles that of the peptic glands of animals—(1) in that it is soluble in glycerine, and (2) in that it exercises a digestive action on proteids only in the presence of an acid, the result of this action being the conversion of proteids into peptones. It cannot be doubted, therefore, that the solution of proteids which was observed in the numerous experiments on *Drosera* detailed in Mr. Darwin's book was effected by a process of true digestion.

A similar line of investigation has been followed by Von Gorup-Besanez † with reference to *Nepenthes* (*phyllamphora* and *gracilis*), though in this case the secretion itself was the subject of experiment. He found that shreds of fibrin, placed in the secretion (which had an acid reaction) were more or less completely dissolved within an hour when exposed to a temperature of 40° C., and that the filtered liquid gave the characteristic peptone reaction with caustic potash and dilute copper sulphate (*Biuretreaction*). The digestive process was very much accelerated by the addition of a few drops of dilute hydrochloric acid (·2 per cent.).

---

* This method consisted in soaking the fibrin in dilute HCl (·2 per cent.) until it is quite gelatinous.

† Berichte der deutsch. chem. Gesellsch. zu Berlin, Jahrg. 9, No. 9, May 22, 1876.

At the time of the publication of Von Gorup-Besanez's paper, I was engaged at the Royal Gardens, Kew, in a series of experiments upon *Nepenthes*, which, I am glad to say, are quite confirmatory of his results. In dealing with the subject, I followed the method of which Riess and Will availed themselves in their investigation of *Drosera*; that is to say, I treated the pitchers of *Nepenthes* (*hybrida* and *gracilis*) just as though they had been the gastric mucous membrane of an animal, first with absolute alcohol, and then with glycerin. I then proceeded to test the digestive properties of the *Nepenthes* extract just in the same way as they tested the *Drosera* extract. I took three test-tubes: in the first I placed a little of the extract and a few drops of dilute hydrochloric acid (·2 per cent.), in the second a little of the extract only, and in the third some of the diluted acid; to each I then added a small piece of swollen-up fibrin and exposed them all to a temperature of 40° C. At the end of eight hours I found that the fibrin in the first tube showed signs of the digestive action of the fluid, and the filtrate gave a distinct peptone reaction. The fibrin in the other two tubes was unaffected; and their filtrates gave no reaction with caustic potash and copper sulphate.

By these experiments I have demonstrated for *Nepenthes* the facts which Riess and Will have brought out concerning *Drosera*, viz. that the glands of the pitchers contain a digestive ferment which is soluble in glycerin, and which can exert its digestive action only in the presence of acid.

The investigations which I have here detailed form together a body of evidence which is amply sufficient to prove the fact that the solution of proteids by plants, described by Dr. Hooker in his Address and by Mr. Darwin in his book, was effected by a true digestive process which resembles in every particular the process of solution of proteids which takes place in the digestive cavity of an animal.

II.

On comparing the results obtained by Von Gorup-Besanez, when experimenting upon the secretion of *Nepenthes*, with those which I obtained when experimenting with the glycerin extract of the pitchers, I was struck with the much greater rapidity with which digestion took place in the former case; and I inferred that the secretion contained a larger quantity of free ferment than the extract. From this I was led to make some experiments as to the origin of the ferment in the gland-cells, with the view, if possible, of placing our knowledge of the origin of the digestive ferment in plants upon a level with that which we possess of the origin of ferments in animals. Ebstein and Grützner*, in their researches upon digestion, found that a glycerin extract of much greater digestive power could be obtained from a gastric mucous membrane which had been previously treated with dilute hydrochloric acid than from a perfectly fresh one; but of this fact they volunteered no explanation. Heidenhain†, in his researches on the digestive ferment of the pancreas, found that from this organ also a more active glycerin extract could be obtained when it had been previously treated with dilute acid. On the evidence of his own experiments, and on that furnished by those of Ebstein and Grützner, he has arrived at the following conclusions. He believes that the gland-cells do not directly secrete the digestive ferment, but that they give rise to a neutral substance, which he terms Zymogen, consisting of a combination of the ferment with (probably) an albuminoid. It is only when this zymogen is decomposed by the action of various agents (dilute acids, moisture, warmth, &c.) that the ferment is set free in the active state, in the gastric juice as pepsin, in the pancreatic secretion as pancreatin.

From a consideration of these views, I inferred that the great difference in rapidity of action existing between the process of digestion when the secretion itself was used, and that when the glycerin extract was used, might be due to the fact that in the former case the ferment was present in its free state, whereas in the latter much of it might still be in the form of zymogen. I therefore endeavoured to discover if by any means I could obtain a more active glycerin extract. I treated some pitchers of *Nepenthes* (*hybrida* and *gracilis*) with dilute acetic acid (1 per cent.) for twenty-four hours previously to the preparation of the glycerin extract; and I instituted comparative experiments between the glycerin extract so obtained and the glycerin extract prepared in the ordinary way from pitchers gathered at the same time from the same plants; and in every case I found that the digestive power of the former was much greater than that of the latter. For instance, I placed a pellet of swollen-up fibrin in a tube containing a small quantity of the acid extract, and a similar pellet in a tube containing the same quantity of the neutral extract. To each I added 2 cubic centims. dilute hydrochloric acid (·2 per cent.), and exposed them both to a temperature of 40° C. At the end of six hours the fibrin in the former tube had undergone complete solution, whereas that in the latter had been but slightly attacked. The filtrates of both tubes gave the peptone reaction.

---

* Pflüger's Arch. für die ges. Phys. 1873, Bd. viii. pp. 122–151.

† Ibid. 1875, Bd. x. p. 581.

These experiments seem to indicate that in the gland-cells of the *Nepenthes* pitchers, as in the secreting cells of the stomach and of the pancreas, the digestive ferment exists at first in combination with some other body, as zymogen—and that in plants, as in animals, this zymogen can be split up by the action of dilute acid, the free ferment making its appearance as a result of this decomposition. In fact, the experiments run perfectly parallel with those of Ebstein and Grützner on the stomach, and with those of Heidenhain on the pancreas, and afford a distinct confirmation of the views of the latter observer.

Lichenes Insulæ Rodriguesii.—An Enumeration of the Lichens collected by Dr. J. B. Balfour in the Island of Rodriguez during the Venus-Transit Expedition, 1874. By the Rev. J. M. Crombie, F.L.S.

[Read June 15, 1876.]

The present collection of lichens, made at intervals from September to December 1874, during the stay of the Venus-Transit Expedition in the Island of Rodriguez, may be regarded as a very fair representation of its lichen-flora. This is a matter which it is always very satisfactory and, in a phytogeographical point of view, most useful to know with respect to the plants collected in any region, whether of limited or larger extent. In the present case, as Dr. Balfour informs me, though some of the specimens were picked up at random, yet special search was for the most part made for lichens. Hence it may be inferred that, with the exception perhaps of Verrucarias, very little was overlooked. Taking into account the small size of the island, which is only about 11 miles long by 5 miles broad, the fact that no portion of it is more than 1100 feet above the sea-level, or more than three miles from the sea-shore, and the nature of the rock, which is entirely volcanic, consisting of alternating layers of basalt, laterite, and in the upper parts trachyte, with portions of upraised coral reef chiefly on the S.W., and more especially the circumstance that the island is very dry, more so now than formerly, when the vegetation was more abundant, we should not infer that its lichen-flora would be very extensive. Accordingly Dr. Balfour's collection of some eighty species and varieties, of which nearly one half are new to science, may certainly be considered to constitute as large a list as could reasonably be expected to occur. Indeed it contrasts very favourably in this respect with the recorded lichen-flora of the neighbouring islands of Mauritius and Bourbon, which are not only of much larger extent, but also in all other respects more favourably circumstanced for the growth of lichens. This will appear when we mention that the lichens of the Mauritius, as enumerated by Dr. Weddell, in vol. vii. (n. ser.) of 'Trans. R. Soc. Arts & Sc. of Maurit.,' 1873, amount to eighty-nine species and varieties, whilst the list of Bourbon lichens given by Nylander in 'Ann. des Sci. Nat.' sér. 4, t. xi. 1859, consists of 125 species and varieties.

In the determination of the Rodriguez novelties, I have again to acknowledge the valuable assistance of Dr. William Nylander, F.M.L.S., who has also kindly sent me his MS. diagnoses of the species determined by him.

Family COLLEMACEI.

Tribe Collemei.

Collema, sp. —— ?

Several specimens of a *Collema* occur which externally bears some resemblance to young states of *C. flaccidum*, but sterile and with the thallus discoloured so as to be quite indeterminable.

On trunks of trees. *Coll. Balf.* no. 2202.

LEPTOGIUM TREMELLOIDES, *Ach.*

Sufficiently typical, and also occasionally somewhat atypical.

On the trunks of trees; fertile. *Coll. Balf.* no. 2201.

Family LICHENACEI.

Tribe CLADONIEI.

CLADONIA BALFOURII, *Cromb.*, sp. n.

Thallus minor, basi squamulosus, squamulis parvis, albo-glaucescentibus, subfirmulis, crenatis, podetiis simplicibus, brevissimis, apice raro divisis, albo-pulverulentis (vel pulvere subvirescenti-albo obductis), K−, contra squamis K+ (flaventibus); apothecia fusca (ut videtur), rite evoluta non visa.

The general aspect of this plant is sufficiently peculiar to warrant its being regarded as a distinct species, notwithstanding that the specimens seen are probably not fully developed as to thallus. Only a few faint traces of young apothecia are visible, which would refer it to the Phæocarpæ, where it seems to have its affinity in the section of *C. pyxidata.*

On dead stumps of trees. *Coll. Balf.* no. 2204.

Tribe ROCCELLEI.

ROCCELLA MONTAGNEI, *Bel.*, f. **TERETIOR**, *Cromb.*

This form is distinguished by the narrow rounded thallus, which gives it more the aspect of *R. phycopsis* than of *R. fuciformis*, which typical specimens more closely resemble.

On rocks; infertile. *Coll. Balf.* nos. 2206, 2288.

Various and evidently young states, which seem referable to this form, are also present.

Tribe USNEEI.

USNEA FLORIDA (*L.*), *Ach.*

On the branches of trees; very sparingly and infertile. *Coll. Balf.* no. 2355.

U. DASYPOGOIDES, *Nyl.*, sp. n. "Subsimilis *Usneæ dasypogæ*, sed thallo subflavido, lævi, glabro, nec nisi in ramulis vel fibrillis sæpius leviter sparsim setuloso (quibus setulis etiam distinguitur ab *U. trichodea*, Ach.). Apothecia ignota."—*Nyl. in litt.*

These specimens vary considerably in length, the largest being upwards of a foot long. Unfortunately none of them are fertile, though scattered "cephalodia" not unfrequently occur.

On the branches of trees: apparently common, *Coll. Balf.* nos. 521, 524, 2323.

Tribe RAMALINEI.

RAMALINA GRACILENTA, *Ach.*

On rocks and trees; fertile and apparently very common. *Coll. Balf.* nos. 2283, 2297.

R. G., f. NODULOSA, *Cromb.* Thallus minute, densely branched and fastigiate, forming more or less rounded nodules.

This is evidently a young or rather stunted condition of the plant, presenting a somewhat singular appearance. In one specimen a single minute apothecium was visible.

On rocks with the type. *Coll. Balf.* no. 2297 *b.*

R. FARINACEA, *Ach., Nyl.*

On the branches (twigs) of trees; probably common. *Coll. Balf.* no. 2324.

R. F., f. PENDULA (*Schrad.*).

On the branches of trees, with the type. *Coll. Balf.* no. 2324 *b.*

R. SUBFRAXINEA, *Nyl.*

On the branches of trees; fertile and apparently common. *Coll. Balf.* no. 2340.

R. CANALICULATA, *Tayl.*

On the branches of trees; fertile, but only sparingly gathered. *Coll. Balf.* no. 2210.

R. C., f. BREVIOR, *Cromb.* Thallus shorter, ½–1 inch; laciniæ rather broader.

On the branches of trees; fertile, but like the type, only sparingly gathered. *Coll. Balf.* no. 2386.

R. INTERMEDIA, *Del., Nyl.*

On rocks: probably not uncommon, but sterile. *Coll. Balf.* no. 2284.

Tribe PARMELIEI.

PARMELIA LATISSIMA, *Del.*

On trees and rocks; sterile, but apparently common. *Coll. Balf.* nos. 2249, 2205.

The thallus is often discoloured, probably from the action of salt water.

P. SUBCONSPERSA, *Nyl.*

On rocks; fertile, only sparingly gathered. *Coll. Balf.* no. 2220.

P. ATRICHOIDES, *Nyl.*

On rocks; very sparingly and infertile. *Coll. Balf.* no. 2227.

Tribe STICTEI.

STICTINA DISSIMILIS, *Nyl.*
On trees; sparingly and infertile. *Coll. Balf.* no. 2277.

S. AGYRACEA, f. **INSIDIATA**, *Nyl.* Thallus somewhat densely covered with isidia.
On trees; sparingly and infertile. *Coll. Balf.* no. 2279.

STICTA AURATA, *Ach.*
On trunks of trees; infertile, but apparently common. *Coll. Balf.* no. 2273.

Tribe PHYSCIEI.

PHYSCIA FLAVICANS, f. **CROCEA** (*Ach.*).
On the branches of trees; sparingly and sterile. *Coll. Balf.* no. 2253.

P. SPECIOSA (*Wulf.*).
On trees and rocks; fertile and apparently common. *Coll. Balf.* nos. 2289, 2324.

P. ÆGIALITA (*Ach. Syn.* p. 179, sub *Lecanora*).
On rocks; fertile, but very sparingly gathered, only a single small specimen being present. *Coll. Balf.* no. 2225.

P. PICTA (*Sw.*).
On the branches of trees; sparingly and sterile. *Coll. Balf.* no. 2373.

Tribe PYXINEI.

PYXINE PETRICOLA, *Nyl.*, sp. n. "Thallus glaucescens, laciniis subintricato-contiguis, adnatis (latit. 1 millim. vel angustioribus), late diffusus; apothecia nigra, planiuscula, lecideina, marginata (latit. 1 millim. vel minora), vel margine extus epithallino obducta, intus obscura; sporæ 8næ, nigrescentes, oblongæ, biloculares, longit. 0·011–0·015 millim., crassit. 0·0045 millim.; epithecium cæruleo-nigricans; paraphyses graciles; hypothecium subincolor. Iodo gelatina hymenialis bene cærulescens.
"Species certe bene distincta notis allatis. Thallus K =."—*Nyl. in litt.*
On rocks; sparingly gathered. *Coll. Balf.* no. 2391.

Tribe LECANOREI.

PANNARIA RUBIGINOSA, f. CINERASCENS, *Nyl.*

Thallus greyish; otherwise similar to the type.

On rocks; very sparingly, and only two apothecia visible on the specimen. *Coll. Balf.* no. 2321.

Two other sterile specimens may belong also to this form.

P. R., var. DISPARTITA, *Nyl.* "Forsan propria species, thallo tenuius diviso, effuso. Apothecia non visa."—*Nyl. in litt.*

On rotten stumps on the ground; sparingly. *Coll. Balf.* no. 2313.

P. LURIDULA, *Nyl.*, sp. n. "Thallus luridus, squamulosus, squamulis crenatis vel crenato-lobatulis, subintricatis; apothecia testaceo-rufa vel testaceo-rufescentia (latit. circiter 1 millim. vel minora), bene lecanorina, margine thallino crassiusculo crenato; sporæ ellipsoideæ, longit. 0·016–0·025 millim., crassit. 0·009–0·011 millim. Iodo gelatina hymenialis cærulescens.

"Affinis *P. immixtæ*, Nyl., sed color thalli luridus et hypothallus niger ullus vix visibilis etc."—*Nyl. in litt.*

On the ground; very sparingly gathered. *Coll. Balf.* no. 2208.

COCCOCARPIA MOLYBDÆA, *Pers.*

On branches of trees; sparingly and infertile. *Coll. Balf.* no. 2243.

HEPPIA RODRIGUESII, *Cromb.*, sp. n. Thallus cervino-luridus, adnato-squamulosus, squamulis planiusculis vel alibi convexiusculis, subanguloso-rotundatis (latit. 1–2 millim. vel sæpius minoribus, crassit. circiter 0·25 millim.), contiguis aut subdispersis; apothecia rubello-carnea, concaviuscula, innata (latit. 0·2–0·3 millim.); thecæ polysporæ; sporæ breviter ellipsoideæ vel oblongo-ellipsoideæ, longit. 0·004–0·006 millim., crassit. 0·0025–0·0035 millim., paraphyses gracilescentes. Iodo gelatina hymenialis cærulescens, dein thecæ præsertim violacee rubescentes.

This is a fine species, which is at once distinguished by the colour of the apothecia. The syngonimia are usually sufficiently small, and then contain but few gonimia. With the exception of the colour of the apothecia, it presents almost the appearance of *Lecanora cervina*, Pers. (*squamulosa*, Schrad.).

On rocks; very sparingly gathered, and only a few apothecia visible. *Coll. Balf.* nos. 2302 and 2233.

LECANORA MURORUM, var. LOBULATA (*Smrf.*).

As the thallus is not sufficiently developed in the specimen seen, the plant is somewhat uncertain, although the apothecia and spores agree with this variety. Spores 0·010–0·013 millim. long, 0·006–0·007 millim. thick.

On rocks; very sparingly gathered. *Coll. Balf.* no. 2350.

L. CINNABARINA (*Sw.*).

On rocks; probably not uncommon; but in the specimens seen associated with other lichens, and not very characteristic. *Coll. Balf.* n. 2301.

L. AURANTIACA (*Lghtft.*).

On the bark of trees; sufficiently typical, though but very sparingly gathered. Spores 0·011–0·016 millim. long. 0·006–0·010 millim. thick. *Coll. Balf.* no. 2336.

L. A., var. ISIDIOSELLA.

A somewhat peculiar variety, which is well distinguished by the thallus being more or less covered with subconcolorous isidia. The apothecia are also smaller and only sparingly present in the few fragments seen.

On the bark of trees; sparingly gathered, and associated with other lichens. *Coll. Balf.* no. 2211.

L. AURANTIELLA, *Nyl.* sp. n. "Subsimilis *L. aurantiacæ* et *erythrellæ*, Ach., sed apotheciis minoribus et innatis, sporis minoribus (longit. 0·010–0·012 millim., crassit. 0·006–0·008 millim.)."—*Nyl. in litt.*

On rocks; sparingly gathered, and associated with other lichens. *Coll. Balf.* no. 2317.

L. LEUCOXANTHA (*Spr.*).

On the bark of trees; apparently common and finely fruited. *Coll. Balf.* no. 2366.

L. GLAUCOFUSCULA, *Nyl.*, sp. n. "Thallus glauco-cinerascens (vel humidus cinereo-virescens), tenuis, continuus, passim subrimosus; apothecia fusca, subinnata, plana (latit. circiter 0·05 millim.), margine thallino tenui vel parum distincto cincta; sporæ 8næ, incolores, placodinæ, longit. 0·009–0·014 millim., crassit. 0·006–0·007 millim.; epithecium (in lamina tenui) lutescenti-inspersum (K purpurascens); hypothecium incolor. Iodo gelatina hymenialis intensive cærulescens. Nulli cognitæ affinis, vergens autem versus *L. encephalarti* (Kphb.)." —*Nyl. in litt.*

On rocks; very sparingly gathered. *Coll. Balf.* no. 2216.

L. G., f. BIATOROIDEA.

This differs from the type only in the apothecia having a more distinctly biatorine appearance.

On rocks; like the type, very sparingly.

L. APOSTATICA, *Nyl.*, sp. n. "Thallus albus vel albidus, tenuis, areo-

lato-rimosus, hypothallo cærulescenti-nigricante passim visibili; apothecia nigra, lecideina, plana, marginata (latit. 0·05–0·07 millim.), intus albida; sporæ 8næ, incolores, placodinæ, longit. 0·011–0·015 millim., crassit. 0·005–0·008 millim.; paraphyses mediocres; epithecium et perithecium cærulescenti-nigrescentia; hypothecium incolor. Iodo gelatina hymenialis intensive cærulescens.

"Est species e stirpe *Lecanoræ diphyodis*, proxima *L. Kurzii* (Kphb.). Affinitas videtur inter *Lecanoras*, etiamsi apothecia lecideina. Thallus K flavens. Spermogonia arthrosterigmatibus munita; spermatia minutula, oblongo-cylindrica, longit. 0·002 millim., crassit. 0·0006 millim."—*Nyl. in litt.*

On rocks; very sparingly gathered. *Coll. Balf.* no. 2354.

* LECANORA OBLIQUANS, *Nyl.* "Differt thallo cinerascente tenuissimo continuo. Occurrit quoque epithecio albo-suffuso. Forsan propria species."—*Nyl. in litt.*

On rocks; apparently not uncommon. *Coll. Balf.* nos. 2229, 2296, 2363.

L. CARNEOFUSCA, *Nyl.*, sp. n.

"Thallus glauco-cinerascens vel glauco-albidus, tenuis, inæqualis, areolato-rimulosus; apothecia carneo-fusca vel rufescenti-fusca, lecanorina (latit. 1 millim. vel minora), margine thallino integro cincta; sporæ 8næ, incolores, placodinæ, longit. 0·011–0·018 millim., crassit. 0·007–0·009 millim.; paraphyses fere mediocres; epithecium sordide sublutescens. Iodo gelatina hymenialis intensive cærulescens.

"Species accedens ad *Lecanoram camptidiam*, Tuck., a qua thallo areolato rimuloso et sporis nonnihil majoribus præsertim differt."—*Nyl. in litt.*

On rocks; probably common. *Coll. Balf.* no. 2293.

L. SUBFUSCA f. PUMICICOLA, *Nyl.* "Differt a f. *campestri*, Schær., præsertim thallo subdisperso, e granulis sat tenuibus constans vel variantibus convexiusculis, ambitu subcrenatis (latit. 1 millim. vel minoribus), passim contiguis. Apothecia fusca (latit. 1 millim. vel minora), margine thallino integro aut obsolete subcrenulato; sporæ longit. 0·011–0·012 millim., crassit. 0·006–0·007 millim.; paraphyses tenues, molles; epithecium rufescenti-fuscum. Iodo gelatina hymenialis cærulescens, dein violaceo tincta."—*Nyl. in litt.*

This very distinct form may easily be recognized by the above characters of the thallus, &c.

On rocks; apparently common. *Coll. Balf.* nos. 2296, 2299.

L. SUBFLAVICANS, *Nyl.*, sp. n.

"Thallus albidus vel albido-flavescens, tenuis, granuloso-inæqualis (K+, flavens); apothecia testaceo-lutescentia vel testaceo-pallida (latit. 0·5–

0·8 millim.), margine crassiusculo-ruguloso-inæquali vel demum integro cincta; sporæ 8næ, incolores, ellipsoideæ, longit. 0·010–0·012 millim., crassit. 0·006–0·008 millim.; paraphyses gracilescentes; epithecium inspersum. Iodo gelatina hymenialis cærulescens, dein thecæ violaceo tinctæ.

"Est species quasi intermedia inter *Lecanoram subgranulatam* et *L. albellam*."—*Nyl. in litt.*

On the bark of trees; very sparingly gathered. *Coll. Balf.* no. 2223.

LECANORA ACHROA, *Nyl.*, sp. n.

"Thallus glaucescens, tenuis, rugulosus, demum rimosus, nigricanti-limitatus (K flavens); apothecia lutescenti-pallida, plana (latit. 0·5–0·6 millim.), superficialia, margine thallino subcrenato vel subintegro cincta; sporæ 8næ, ellipsoideæ, longit. 0·010–0·016 millim., crassit. 0·006–0·008 millim.; paraphyses graciles; epithecium granuloso-inspersum. Iodo gelatina hymenialis cærulescens, dein thecæ obscure nonnihil violacee tinctæ.

"Ex affinitate videtur *Lecanoræ chlaronæ*. Spermatia vulgo leviter arcuata, longit. 0·018–0·023 millim., crassit. 0·0005 millim. (minus arcuata quam in comparanda *L. achroella*, quæ simul aliis notis differt)."—*Nyl. in litt.*

On the bark of trees; perhaps frequent. *Coll. Balf.* no. 2311.

L. ACHROELLA, *Nyl.*, sp. n.

"Thallus glaucescens, tenuis, sublævigatus, rimulosus, nigricanti-limitatus (K flavescens); apothecia lutescenti-pallida, plana, subinnata, minuta (latit. circiter 0·3 millim.), margine thallino tenui integro cincta; sporæ 8næ, ellipsoideæ, longit. 0·009–0·014 millim., crassit. 0·006–0·007 millim.; paraphyses graciles; epithecium vix vel parum inspersum. Iodo gelatina hymenialis cærulescens, dein thecæ subviolaceo tinctæ vel violaceo-fulvescentes.

"Ex affinitate videtur *Lecanoræ chlaronæ*. Spermatia arcuata, longit. 0·015–0·018 millim., crassit. 0·0005 millim."—*Nyl. in litt.*

On the trunks of trees, associated with the preceding, and very sparingly gathered. *Coll. Balf.* no. 2255.

L. PERLUTESCENS, *Nyl.*, sp. n.

"Thallus flavidus vel albido-flavescens, tenuis, subleprosus, determinatus; apothecia cerino-lutea vel luteo-pallescentia (latit. 0·4–0·6 millim.), plana, margine thallino tenui integro vel evanescente cincta; sporæ 8næ, oblongæ vel ellipsoideæ, longit. 0·009–0·013 millim.; crassit. 0·0035 millim.; paraphyses gracilescentes; epithecium inspersum. Iodo gelatina hymenialis cærulescens, dein lutescens.

"Affinis *Lecanoræ lutescenti* (DC) sed minor, magis determinata, sporæ minores etc. Thallus et nonnihil apothecia CaCl erythrinose vel aurantiace tincta. Spermatia arcuata, longit. circiter 0·016 millim., crassit. 0·0005 millim."—*Nyl. in litt.*

On the bark of trees; very sparingly gathered. *Coll. Balf.* no. 2222.

LECANORA CONIZÆA (*Ach.*), *Nyl.*

Entirely similar to our European plant. Thallus CaCl—. Spores 0·010–0·014 millim. long, 0·003–0·004 millim. thick.

On decorticated trunks; perhaps not uncommon. *Coll. Balf.* no. 2335.

L. CONIZOPTA, *Nyl.*, sp. n.

"Thallus albidus, tenuis, opacus, passim rimulosus (K flavens); apothecia carneo-lutea vel luteo-rubella, subinnata, plana (latit. 0·2–0·4 millim.), margine thallino depresso inæquali cincta; sporæ 8næ, ellipsoideæ, simplices, longit. 0·010–0·012 millim., crassit. 0·005–0·006 millim.; paraphyses gracilescentes. Iodo gelatina hymenialis cærulescens.

"Videtur e stirpe *Lecanoræ conizææ*, et notis datis facile agnoscitur."—*Nyl. in litt.*

On rocks; sparingly gathered. *Coll. Balf.* no. 2217.

L. PARELLA * PHLŒOLEUCA, *Nyl.*

"Thallo tenuissimo albo præsertim differens a typo, et facie apotheciorum subpertusariodea. Sporæ longit. 0·038–0·050 millim., crassit. 0·023–0·025 millim. Fortasse propria species."—*Nyl. in litt.*

On the bark of trees (twigs); very sparingly gathered. *Coll. Balf.* no. 2330.

L. ATRA, f. SUCCEDANEA, *Nyl.* "Differt a *L. atra* europæa saltem spermatiis nonnihil brevioribus (longit. 0·007–0·011 millim., crassit. fere 0·001 millim.)."

On the bark of trees, dead wood, and on rocks; apparently common. *Coll. Balf.* nos. 2207, 2292.

L. PUNICEA, *Ach.*

On the bark of trees; very fine and apparently not uncommon. *Coll. Balf.* no. 2238.

PERTUSARIA VELATA (*Turn.*).

On the branches of trees; sparingly gathered and quite similar to our British plant. *Coll. Balf.* no. 2215.

P. IMPALLESCENS, *Nyl.*, sp. n.

"Thallus albidus, opacus, continuus, tenuis (crassit. circiter 0·2 millim.), sublævis, passim rimosus vel rimulosus (K –); apothecia incoloria in protuberantiis thallinis depresso-convexulis innata, 1–4 in quavis tali protuberantia, ostiolis nigris, punctiformibus, vix prominulis; sporæ 8næ, incolores, solitæ generis, longit. 0·070–0·082 millim., crassit. 0·032–0·040 millim. Iodo gelatina hymenialis intensive cærulescens.

"Notis datis satis distincta species, nec ulli cognitæ affinis. Spermatia peculiaria, aciculari-fusiformia (vel fusiformia utroque apice longe

aciculari-producto), longit. 0·007–0·009 millim., crassitie medio vix 0·001 millim."—*Nyl. in litt.*

On rocks; rather sparingly gathered. *Coll. Balf.* no. 2214.

Tribe LECIDEEI.

LECIDEA ACHROOPHOLIS, *Nyl.*, sp. n.

"Thallus albidus vel pallescenti-albidus, squamulosus, squamulis (latit. circiter 1–2 millim.) adnatis, planis, contiguis vel subdispersis, ambitu sublobatulis vel interdum subcrenatis, subtus nigris; apothecia nigra, planiuscula, marginata (latit. 0·7–1·5 millim.), intus obscura; sporæ 8næ, incolores, oblongæ, simplices (vel obsolete vel spurie 1-septatæ), longit. 0·009–0·014 millim., crassit. 0·0035–0·0045 millim.; paraphyses mediocres apice subpurpurascenti-fusco; epithecium et hypothecium subpurpurascenti-infuscata (vel hoc parte supera rufescente). Iodo gelatina hymenialis cærulescens, dein subfulvescens.

"Species insignis in stirpe *Lecideæ decipientis,* ut videtur. Thallus firmus K non reagens. Thalamium totum dilute subpurpurascens et K simul cum epithecio et perithecio et hypothecio inferiore purpurascens. Spermogonia supra nigella, intus incoloria; spermatia tenuiter bacillaria nonnihil vel obsolete curvula (quare subrecta apparent, licet vix unquam sint vere recta), longit. 0·005–0·007 millim., crassit. 0·0006 millim."—*Nyl. in litt.*

On rocks; probably not uncommon. *Coll. Balf.* no. 2272.

L. COCCOCARPIOIDES, *Nyl.*, sp. n.

"Thallus albido-glaucescens, squamaceus, subadnatus, squamis (latit. 2–5 millim.) inciso-lobatis, incisuris clausis (nec hiantibus) et nigricantibus, ambitu subcrenulato, pagina infera nigra; apothecia nigra, innata, planiuscula, immarginata (latit. 1–2 millim.), interdam 2–3 confluentia, intus obscura; sporæ 8næ, ellipsoideæ vel oblongæ, 1-septatæ (septo saltem spurio), longit. 0·006–0·012 millim., crassit. circiter 0·0035 millim.; paraphyses mediocres; epithecium cærulescens; hypothecium obscure rufescens. Iodo gelatina hymenialis bene cærulescens.

"Species omnino peculiaris et propriæ stirpis. Facie fere *Coccocarpiæ molybdææ,* sed thallus subnitidiusculus, nihil superficie concentrici habet, et ceteroquin est gonidicus."—*Nyl. in litt.*

On rocks; very sparingly gathered. *Coll. Balf.* no. 2219.

L. MELOPTA, *Nyl.*, sp. n.

"Thallus albus, tenuis, areolatus, in hypothallo nigro subprædominante instratus; apothecia nigra, in areolis vulgo demum singulatim innata, plana (latit. 0·5–0·7 millim.), immarginata; sporæ 8næ, incolores, ellipsoideæ, longit. 0·008–0·010 millim., crassit. 0·004 mlilim.; paraphyses non distinctæ; epithecium cærulescens; hypothecium incolor. Iodo gelatina hymenialis bene cærulescens.

"Species bene distincta, et fere urceolariiformis, inter species stirpis *Lecideæ planæ*. Thallus K flavens (I demum nonnihil subroseo tinctus, hæc reactio vero passim obsoleta). Variat thallus crassior (crassit. 0·5 millim.) et pluribus apotheciis in quavis areola (areolis circumcirca lateribus nigris), apotheciis impressiusculis."—*Nyl. in litt.*

On rocks; probably not uncommon. *Coll. Balf.* no. 2281.

LECIDEA DISCIFORMIS (*Fr.*), *Nyl.*

On the bark of trees; rather sparingly gathered. *Coll. Balf.* no. 2331.

L. TRIPHRAGMIA, *Nyl.*

On the bark of trees; probably not unfrequent. *Coll. Balf.* no. 2368.

L. SPURIA (*Schær.*).

On rocks; apparently not uncommon. *Coll. Balf.* no. 2351.

L. IMMUTANS, *Nyl.*, sp. n. "Thallus ochraceo-rosellus (verisimiliter autem typice albidus), areolato-diffractus (crassit. circiter 0·2 millim.), determinatus (K +, flavens); apothecia nigra, superficialia, plana, obtuse marginata (latit. 0·5–0·9 millim.), intus concoloria; sporæ 8næ, fuscæ, ellipsoideæ, 1-septatæ, longit. 0·016–0·023 millim., crassit. 0·008–0·010 millim., leviter superficie granuloso-inæquales; paraphyses gracilescentes (non bene discretæ); epithecium et hypothecium luteo-fuscescentia (aut hoc magis infuscatum). Iodo gelatina hymenialis intensive cærulescens.

"Species bene distincta in stirpe *Lecideæ spuriæ*. Thallus I −. Spermatia breviter bacillaria, longit. 0·004 millim., crassit. 0·0006 millim."—*Nyl. in litt.*

On rocks; very sparingly gathered. *Coll. Balf.* no. 2221.

L. CONTINENS, *Nyl.*, sp. n.

"Thallus lacteus vel sublutescenti-albidus, sat tenuis, continuus, superficie areolato-rimulosus (K flavens, medulla I cæruleo-obscurata); apothecia nigra, plana, marginata (latit. 0·5–0·6 millim.), margine fuscescente, intus obscura; sporæ 8næ, fuscæ, ellipsoideæ, 1-septatæ, longit. 0·011–0·014 millim., crassit. 0·006–0·007 millim.; paraphyses fere mediocres; epithecium et hypothecium fuscescentia. Iodo gelatina hymenialis intensive cærulescens.

"Ad *Lecideam spuriam* quodammodo accedens et reactionibus conveniens, at thallus alius. Variat perithecium fusco-pallescens. Spermogonia non visa.

On rocks; very sparingly gathered. *Coll. Balf.* no. 2343.

L. CONFIGURANS, *Nyl.*, sp. n.

"Thallus lutescenti-glauco-albidus, lævis (crassit. 0·5 millim. vel tenuior), subrimulosus, determinatus; apothecia fusco-nigra vel fusca, innata, plana (latit. 0·3–0·5 millim.), immarginata, circumscissa, intus albido-incoloria, demum 2–6 submoniliformi-confluentia (tum quasi lomentaceo-linearia et varie flexuosa); sporæ 8næ, incolores, oblongæ, simplices, longit. 0·011–0·014 millim., crassit. 0·004–0·005 millim.; paraphyses graciles; epithecium sublutescens aut dilute glauco-fuscescens; hypothecium incolor. Iodo gelatina hymenialis cærulescens, dein violascens.

"E stirpe *Lecideæ lævigatæ* species, simplex, facie fere *Lecideæ phæopis.* Thallus K flavens."—*Nyl. in litt.*

On rocks; sparingly gathered. *Coll. Balf.* no. 2224.

Tribe GRAPHIDEI.

OPEGRAPHA DIFFICILIOR, *Nyl.*, sp. n.

"Thallus macula albescente indeterminata vel obsoleta indicatus; apothecia nigra linearia (longit. 1–2 millim. vel breviora, crassit. fere 0·25 millim.), subsimplicia, recta aut subflexuosa, superficialia; epithecium rimiforme demum arcte angustatum; sporæ 8næ, fusiformes (vetustate obscuratæ), 5–7-septatæ, longit. 0·027–0·033 millim., crassit. 0·004–0·006 millim., hypothecium nigricans. Iodo gelatina hymenialis vinose rubens.

"Sat affinis *Opegraphæ hapaleoidi,* sed thallo, apotheciis et sporis differens. Apothecia sæpius conferta. Spermatia tenuia, rectiuscula, longit. 0·004–0·005 millim., crassit. 0·0005 millim. Comparanda, quoad faciem, cum *O. difficili,* Duf. (quæ non est nisi *O. cinerea,* Chev.! lignicola), spermatiis aliis mox divergens."—*Nyl. in litt.*

On decorticated stumps of trees; sparingly gathered. *Coll. Balf.* no. 2251.

ARTHONIA PHYLLOIÇA, *Nyl.*, sp. n.

"Thallus macula alba indicatus; apothecia nigra tenuia erumpentia linearia (longit. 1 millim. vel nonnihil longiora aut breviora, latit. parum 1 millim. excedentia), simpliciuscula aut ramulum unum alterumve emittentia, variantia subastroidea; sporæ 8næ, incolores, oblongæ, 3-septatæ, minutæ, longit. circiter 0·011 millim., crassit. 0·003–0·004 millim.; epithecium subcærulescens. Iodo gelatina hymenialis vinose rubens (præcedente cærulescentia)."—*Nyl. in litt.*

On thin stems; sparingly gathered; *Coll. Balf.* no. 2226.

A. DENDRITELLA, *Nyl.*, sp. n.

"Thallus macula albo-cinerascente subdeterminata indicatus; apothecia nigricantia, tenuia, innata (latit. 0·1 millim. vel tenuiora), subdendritico-divisa aut simpliciora, sat conferta; sporæ 6–8næ, incolores, oviformi-oblongæ, 3-septatæ, longit 0·010–0·014 millim., crassit. 0·004–0·005 millim.; epithecium cærulescenti-nigrescens; hypothecium incolor. Iodo gelatina hymenialis subincolor et thecæ vinose violascentes.

"Species e stirpe *Arthroniæ palmicolæ,* præcipue facie nebuloso-petricola et reactione iodo effecta distincta."—*Nyl. in litt.*

On thin bark of trees; sparingly gathered. *Coll. Balf.* no. 2300.

GRAPHIS SCALPTURATA, *Ach.*

On branches of trees; very sparingly gathered. *Coll. Balf.* no. 2365.

G. ASSIMILIS, *Nyl. Prodr. Gall.* p. 150 (*N. Gran.* p. 74).

On the bark of trees; very sparingly gathered. *Coll. Balf.* no. 2312.

G. ANALOGA, *Nyl.*

On the bark of trees, associated with other lichens; sparingly gathered. *Coll. Balf.* no. 2218.

GLYPHIS CICATRICOSA, var. FAVULOSA (*Ach.*) *Nyl. N. Gran.* p. 108.

On branches (twigs) of trees; very sparingly gathered. *Coll. Balf.* no. 2295.

G. TRICOSULA, *Nyl.*, sp. n.

"Thallus albus vel albidus, opacus, tenuissimus, tenuiter nigricanti-limitatus; apothecia nigra, subcæsio-pruinosa, dendroideo-divisa, sparsa, parum ramosa (divisionibus latit. 0·2 millim. vel tenuioribus); sporæ 8næ, oblongæ, 4-loculares, longit. 0·011–0·012 millim., crassit. 0·005–0·006 millim. (demum infuscatæ); hypothecium fuscum.

"Est *Glyphis* facie *Medusulæ tricosæ* simplicioris, notis allatis satis tute distinguenda."—*Nyl. in litt.*

On the thin epidermis of bark; very sparingly gathered. *Coll. Balf.* no. 2363.

Tribe PYRENOCARPEI.

VERRUCARIA 5-SEPTATULA, *Nyl.*, sp. n.

"Thallus macula albida indistincta vel nigricanti-limitata indicatus; apothecia pyrenio integre nigro, supra denudata convexula (latit. 0·2–0·5 millim.); sporæ 8næ, incolores, fusiformes 5-septatæ, parvæ, longit. 0·013–0·018 millim., crassit. 0·004–0·005 millim.; paraphyses sat graciles, non confertæ. Iodo gelatina hymenialis non tincta.

"Species videtur e stirpe *Verrucariæ chloroticæ*, sed paraphyses minus confertæ, quamobrem sit potius stirpis *Verrucariæ 5-septatæ*, Nyl. Pyrenoc. p. 58."

On the thin epidermis of bark of trees; very sparingly gathered. *Coll. Balf.* no. 2352.

V. CHLOROTICA, *Ach.*

On rocks; probably not uncommon, and quite similar to the European plant. Spores 0·018 millim. long, 0·0045 millim. thick.

On rocks; probably common. *Coll. Balf.* no. 2282.

V. DENUDATA, *Nyl. Pyrenoc.* p. 49.

On the bark of trees; very sparingly gathered. *Coll. Balf.* no. 2244.

TRYPETHELIUM CRUENTUM, *Mnt.*

On the bark of trees; very sparingly gathered. Spores 0·026–0·036 millim. long., 0·012–0·015 millim. thick. *Coll. Balf.* 2275.

T. CRUENTULUM, *Nyl.*

"Forsan subspecies *Trypethelii cruenti,* Mnt., Nyl. Pyrenoc. p. 73, a quo differt præcipue sporis minoribus (longit. 0·018–0·025 millim., crassit. 0·008–0·011 millim."—*Nyl. in litt.*

On the branches of trees; probably common. *Coll. Balf.* no. 2240.

PYRENASTRUM AMERICANUM, *Spr.*

On the thin bark of trees; perhaps not uncommon. *Coll. Balf.* no. 2274.

In addition to the above, there are traces of various other and chiefly crustaceous Lichens in Dr. Balfour's collection. These, however, appear in most cases with sterile thallus, or occasionally with apothecia not rightly developed; so that they are wholly indeterminable.

CONTRIBUTIONS TO THE BOTANY OF H.M.S. 'CHALLENGER.'

XXXIV. Note on the Freshwater Algæ collected by H. N. Moseley, M.A., in Kerguelen's Land. By W. ARCHER, F.R.S., M.R.I.A. Communicated by Sir J. D. HOOKER, M.D., Pres.R.S.

[Read June 15, 1876.]

ON looking over the Freshwater Algæ collected at Kerguelen's Land by Mr. Moseley, one experiences a feeling of disappointment that not any should have presented fructification, and hence, in the few diverse forms occurring therein, the specific identity, especially as relates to Chlorophyllaceous types, remains uncertain. As regards these, however, there is no *à priori* reason to suppose that they are in reality in any respect different from the similar forms which are sufficiently common at home. However, considering the extreme distance of Kerguelen's Land from any continent, and its great remoteness and isolation, that its commonplace freshwater-algal flora should not be different from our own in this quarter of the globe is in itself a fact not without its interest.

The collections being put up in strong methylated spirit of wine was against the maintenance of the characteristic appearance of some of the specimens; but the genus at least was always recognizable. It might be a question whether a much smaller proportion of the spirit, with a little glycerine added to the water taken up with the gathering, might not on the whole be a more suitable medium than the strong spirit.

The bottles contained at least two forms of *Spirogyra,* probably

S. quinnia and *S. condensata*, a *Mesocarpus*, or, as the case might be, a *Staurospermum*, a long-celled *Zygnema*, three forms of *Œdogonium*, one very slender, another less so, and a thicker nearly square-celled species, I believe all quite distinct; but none (as mentioned) showed fruit. The contents in all cases were considerably altered and collapsed. *Zygogonium delicatulum* and *Conferva bombycina* made their appearance. A very slender *Vaucheria* also showed itself. *Microthamnion Kuetzingianum* was present (a very minute but, at home, common-enough little alga, of uncertain position). *Pediastrum Boryanum* and *P. ellipticum* showed themselves. Of Desmidieæ the representatives were very few and minute—a *Closterium* very like *C. parvulum*, Näg., but more slender, a minute *Cosmarium*, generally referred as a variety of *C. Meneghinii*, also *C. crenatum*, Näg. (?). Of Phycochromophyceæ, a macerated Nostoc (or Nostochaceous alga) also occurred, as well as a *Schizothrix* and *Tolypothrix distorta*.

There were a number of Diatoms already described by the Rev. E. O'Meara (Contrib. xxviii.). The empty carapace of a *Vaginicola* was here and there to be met with.

From this it may safely enough be assumed that the characteristic freshwater-algal flora of that remote region is very much the same as our own. Of course it is quite possible that a diligent search at different seasons might yield certain rarities or some novelties *.

XXXV. Notes on Algæ collected by H. N. Moseley, M.A., of H.M.S. 'Challenger,' chiefly obtained in Torres Straits, Coasts of Japan, and Juan Fernandez.

By Prof. Dickie, M.D., F.L.S.

[Read June 15, 1876.]

(1) *Algæ from the Neighbourhood of Torres Straits.*

Mr. Moseley's note accompanying the specimens is here quoted:—

---

* [The above conclusions of Mr. Archer seem at variance with the researches of Mr. P. F. Reinsch, who describes as new to science three genera and some thirty species of freshwater Algæ from Kerguelen's Island (*vide* Journ. Linn. Soc. Bot. vol. xv. pp. 205–251). Doubtless the longer stay and hence greater opportunities afforded for collecting to the Rev. A. E. Eaton in the Transit-of-Venus Expedition, above referred to, may to some extent account for the paucity and non-rarity of the specimens obtained by the 'Challenger' Expedition.—Ed.]

"These Algæ were found at Somerset, at low-tide mark; dredged at Cape York in 5–8 fathoms, and off Wednesday Island, Torres Straits. From these three localities the specimens were unfortunately mixed. The places, however, are close together; and there seemed little difference in the flora."

FUCACEÆ.

SARGASSUM LANCEOLATUM, *J. Ag.*?

Two very indifferent specimens, having lanceolate leaves attenuate toward base and apex, one row of glands on each side of the midrib, which reaches the apex; leaves slightly toothed; vesicles spherical, not apiculate, and shorter than the supporting pedicels.

S. VULGARE, *Ag.*?

Probably a narrow-leaved variety of this species.

DICTYOTACEÆ.

PADINA PAVONIA, *L.*

DICTYOTA LATA, *Lamx.*?

Very fragmentary, agreeing in the distribution of the fructification, "in lineas polymorphas per totam frondem sparsis" (*Lamouroux*).

RHODOMELACEÆ.

ACANTHOPHORA THIERII, *Lamx.*

LEVEILLEA SCHIMPERI, *Dne.*

NEURYMENIA FRAXINIFOLIA, *J. Ag.*

DICTYMENIA TRIDENS, *Grev.*

D. SONDERI, *Harv.*

AMANSIA GLOMERATA, *Ag.*

POLLEXFENIA PEDICELLATA, *Harv.*

A broad variety.

THURETIA TERES, *Harv.*

A dwarf variety.

POLYSIPHONIA HOOKERI, *Harv.*

LAURENCIACEÆ.

LAURENCIA FILIFORMIS, *Ag.*

L. OBTUSA, *Huds.*

LAURENCIA GREVILLEANA, *Harv.*?

The specimens bleached and partly decomposed.

ASPARAGOPSIS SANDFORDIANA, *Harv.*

CORALLINACEÆ.

MASTOPHORA LAMOUROUXII, *Dne.*

CHEILOSPORUM SAGITTATUM, *Aresch.*

MELOBESIA VERRUCATA, *Lamx.*

On *Sargassum* and other Algæ.

SPHÆROCOCCOIDEÆ.

CORALLOPSIS URVILLEI, *Mont.*

C. AUSTRALASICA, *Sonder.*

A few bad examples apparently of this species.

GRACILARIA RAMALINA, *Harv.*

G. FURCELLATA, *Mont.*?

The specimens in bad condition and therefore doubtful.

THYSANOCLADIA LAXA, *Sonder.*

CURDIEA OBTUSATA, *Harv.*?

Without fruit and rather imperfect.

GELIDIACEÆ.

EUCHEUMA SPINOSUM, *L.*

A form with very acute spines and probably identical with *Gelidium aculeatum*, Hering (*Sphærococcus Heringii*, Ktz.).

ACROTYLUS PRISMATICUS, *J. Ag.*

The few specimens in Mr. Moseley's collection certainly belong to this species, first described by Prof. J. Agardh and found on the shores of Hindostan.

LIAGORA VISCIDA, *Ag.*

ERYTHROCLONIUM SONDERI, *Harv.*

RHODOPHYLLIS VOLANS, *Harv.*

CRYPTONEMIACEÆ.

CHRYSYMENIA UVARIA, *J. Ag.*

HALYMENIA FLORESIA, *Ag.*

By way of supplement to the Red Algæ, I record here an imperfect and partially decayed Alga with the general aspect and colour of *Codium damæcorne*, Bory ; the red colouring-matter having disappeared, the more permanent green chlorophyll remains. The structure is that of *Hymenocladia*, the whole tissue infested with the mycelium of a mould, and the entire surface incrusted with a thin sponge which, Mr. Carter informs me, "belongs to the Holoraphidota, Family Suberitida, Group Cavernosa, and very much resembling *Cliona celata*."

The specimens were adherent to *Halimeda macroloba*.

SIPHONACEÆ.

CAULERPA CUPRESSOIDES, *Vahl.*

C. PLUMARIS, *Forsk.*

C. SIMPLIUSCULA, *Ag.*

C. VERTICILLATA, *J. Ag.*

C. CYLINDRACEA, *Sonder.*

HALIMEDA INCRASSATA, *Lamx.*

H. MACROLOBA, *Dne.*

H. CUNEATA, *Hering.*

UDOTEA FLABELLATA, *Lamx.*

A single specimen which I refer to this species.

CODIUM TOMENTOSUM, *Ag.*

VALONIACEÆ.

DITYOSPHÆRIA FAVULOSA, *Sonder.*

(2) *Algæ collected in Akashi Channel near Kobe* (*Hiogo*) *Nipon, Japan*, in 4 to 6 fathoms, the bottom consisting of granite pebbles.

FUCACEÆ.

SARGASSUM PINNATIFOLIUM, *Ag.*

S. OBTUSIFOLIUM, *Ag.*?

One imperfect specimen.

DICTYOTACEÆ.

PUNCTARIA LATIFOLIA, *Grev.*?

Several examples, much torn and without the point of attachment, may be referred with some doubt to this species. They have the same structure, but are more luxuriant than British specimens.

CHORDARIACEÆ.

CHORDA FILUM, *Lamx.*

Attached to small stones.

CHORDARIA FLAGELLIFORMIS, *Lightf.*
Smaller and paler than British examples.

ECTOCARPACEÆ.

ECTOCARPUS SILICULOSUS, *Lyngb.*

Mr. Moseley's are not well prepared; I think, however, they must belong to this species, and to the ordinary form with short pedicels to the sporangia, the latter being like those of the British plant.

CERAMIACEÆ.

CERAMIUM RUBRUM, *Huds.*

(3) *Algæ collected on the Shores of Osima Harbour*, S. coast of Nipon, Japan. The rocks composed of slate with dykes of porphyry.

FUCACEÆ.

SARGASSUM SCOPARIUM, *Turner.*

S. PINNATIFOLIUM, *Ag.*

S. HEMIPHYLLUM, *Turner.*

S. MICROCERATIUM, *Mertens.*

CYSTOPHYLLUM SWARTZII, *Ag.*

CYSTOSEIRA SPICIGERA, *Mertens?*
A fragment only.

TREPTACANTHA SONDERI, *Ktz.*

FUCUS LEPTOPHYLLUS, *Ktz.*

LAMINARIACEÆ.

LAMINARIA JAPONICA, *Aresch.*

DICTYOTACEÆ.

PADINA COMMERSONII, *Bory.*

HYDROCLATHRUS CANCELLATUS, *Bory.*

CORALLINACEÆ.

LITHOTHAMNION POLYMORPHUM, *L.*

Found cast on shore near the village of Hasingui, in Osima Harbour.

AMPHIROA GAILLONII, *Lamx.?*
Very fragmentary specimens.

A. DILATATA, *Lamx.*
A dwarf form.

SPHÆROCOCCOIDEÆ.

GRACILARIA CONFERVOIDES, *L.*

G. CORONOPIFOLIA, *J. Ag.*

Specimens badly preserved and no fruit, but most probably this species.

SPHÆROCOCCUS TEXTORII, *Suringar.*

A single specimen, which agrees with Suringar's figure and description.

GELIDIACEÆ.

GELIDIUM AMANSII, *Lamx.*

HELMINTHOCLADIEÆ.

GINNANIA FURCELLATA, *Turner.*

CRYPTONEMIACEÆ.

KALLYMENIA CRIBROSA, *Harv.* ?

The only specimen, 3 inches in breadth, has the structure of the genus and the cribrose character. The point of attachment is wanting. It may be a dwarf variety of the species, or new; it is therefore marked doubtful.

CONFERVACEÆ.

CHÆTOMORPHA CRASSA, *Ag.*

CLADOPHORA WRIGHTIANA, *Harv.* ?

Only a single specimen, which is probably this species.

C. COACTA, n. sp. Pusilla, coacta, cellulis primariis cylindricis diametro 8–10plo longioribus; ramulis ultimis urceolatis, hinc illinc anastomosantibus, articulis diametro 2–4plo longioribus.

Forming dense spongy masses, in which respect it seems to differ from *C. anastomosans*, Harv., to which it is allied.

(4) *Algæ from Yokosha, Japan.*

LAMINARIACEÆ.

CAPEA ELONGATA, *Mertens.*

SPHÆROCOCCOIDEÆ.

GRACILARIA CONFERVOIDES, *L.*

A single specimen, not quite perfect, must, I think, be referred to this species. Both these were found by Professor Wyville Thomson.

From the sea-surface, lat. 34° 37′ N., long. 140° 32′ E., about 40 miles S.E. of Nosima, St.-Mela Head, Nipon, Japan, found by Mr. Moseley.

SARGASSUM MICROCERATIUM, *Mertens.*

(5) *Algæ collected at Juan-Fernandez Island.*

DICTYOTACEÆ.

ZONARIA VARIEGATA, *Lamx.*

The specimens very dwarf.

DICTYOTA KUNTHII, *Ag.*

D. NÆVOSA, *Suhr.*

The specimens seem quite identical with this species, which occurs on the coast of Tasmania and at the Cape of Good Hope.

ASPEROCOCCUS SINUOSUS, *Roth.*

A. ECHINATUS, *Mert.*

There are specimens in different stages, the larger nearly 2 feet long.

CHORDARIACEÆ.

CHORDARIA HIPPUROIDES, *Bory.*

RHODOMELACEÆ.

POLYSIPHONIA PARASITICA, *Huds.*—Var. γ. *reptans* (*P. dendritica*, Mont.)

P. VILLUM, *Ag.*

On *Codium tomentosum.*

CORALLINACEÆ.

CORALLINA SUBULATA, *Ell. & Sol.*

C. BERTERI, *Mont.*

MELOBESIA PUSTULATA, *Lamx.*

CRYPTONEMIACEÆ.

GIGARTINA CONTORTA, *Bory.*

Mr. Moseley's specimens are small, about an inch in height, and appear to belong to this species, respecting which Prof. Agardh says, "ad *G. Lessonii* forsan nimium accedit."

CERAMIACEÆ.

CERAMIUM RUBRUM, *Hudson.*

CENTROCERAS MICRANTHUM, *Ktz.*

PTILOTA PARVA, n. sp. Pinnis oppositis difformibus, una minore simplici, subulata, altera majore, pinnulata, pinnulis subulatis obtusis, vel subconicis, omnibus cellulosis. Sphærosporis —? Favellis —?

A few specimens were found mixed with *Centroceras*; they are about an inch in height; no fructification can be seen.

Siphonaceæ.

Codium tomentosum, *Stackh.*

A slightly branched variety 2 to 3 feet long.

Ulvaceæ.

Ulva latissima, *L.*

Enteromorpha intestinalis, *Link.*

Both species are dwarf.

Confervaceæ.

Chætomorpha ærea, *Dillw.*

C. tortuosa, *Dillw.*

Diatomaceæ.

Cocconeis scutellum, *Ehr.*

Forming a white crust on *Gigartina.*

Melosira nummuloides, *Ktz.*

Grammatophora marina, *Ktz.*

Biddulphia aurita, *Bréb.*

B. pulchella, *Gray.*

Climacosphæria moniligeea, *Ehr.*

(6) *Algæ found at Honolulu Harbour.*

Fucaceæ.

Sargassum obtusifolium, *J. Ag.*

S. densum, n. sp.?

Frondibus ex collo in caules plures divisis; ramis parce muriculatis. foliis linearibus obtusis, costatis, dense stipatis, hinc et hinc furcatis, multiplice glandulosis; receptaculis linearibus, terminalibus, furcato-ramosissimis; vesiculis —?

S. incisum, n. sp.?

Foliis linearibus crispatis, inciso-dentatis, ad apicem costatis, duplici serie glandulosis; vesiculis terminalibus sphæricis, muticis, glandulosis, breviter pedicellatis. Receptaculis —?

Turbinaria vulgaris, *J. Ag.*

Dictyotaceæ.

Dictyota spinulosa, *Harv.*?

A solitary specimen, not quite perfect, seems to belong to this species.

Asperococcus bullosus, *Lamx.*

ECTOCARPACEÆ.

ECTOCARPUS CÆSPITALIS, *J. Ag.*

Mr. Moseley's specimens agree with the characters of joints and trichosporangia.

SPHACELARIA FURCIGERA, *Ktz.*

SQUAMARIACEÆ.

PEYSSONNELIA RUBRA, *Dne.*

Small specimens on *Halimeda opuntia.*

HELMINTHOCLADIEÆ.

GALAXAURA LAPIDESCENS, *Lamx.*

G. SPONGIOSA, *Ktz.*

SIPHONACEÆ.

HALIMEDA OPUNTIA, *Lamx.*

VALONIACEÆ.

MICRODICTYON AGARDHIANUM, *Dne.*

ULVACEÆ.

ULVA LATISSIMA, *L.*

ENTEROMORPHA COMPRESSA, *Grev.*

CONFERVACEÆ.

CLADOPHORA INSERTA, n. sp.

Flaccida, ramis alternatim fasciculatis, ramulis subsecundatim ramellosis; articulis primariis diametro 8–10plo longioribus, ramulorum diametro 2–3plo longioribus.

(7) *Algæ collected in Helo Bay, Hawai, Sandwich Islands.*

CRYPTONEMIACEÆ.

AHNFELTIA CONCIONA, *J. Ag.*

"Extremely abundant on the basaltic rocks at Hilo Bay, forming a conspicuous zone on the rocks left partly dry at low tide. About tide-marks the rocks are concealed by a dense coating of this Alga, the appearance reminding one of the growth of *Fucus* on our British shores." Mr. Moseley further adds, "Such a growth of Algæ is very unusual, so far as I have seen, in the Tropics."

ULVACEÆ.

ULVA LATISSIMA, *Ag.*

ENTEROMORPHA COMPRESSA, *Grev.*, var. **TRICHODES**, *Ktz.*

CONFERVACEÆ.

CHÆTOMORPHA PACIFICA, *Ktz.*

(8) *Algæ collected on the Reefs at Tahiti.*

FUCACEÆ.

SARGASSUM BINDERI, *Sonder.*

Only two rather fragmentary specimens. The vesicles are described as either elliptic or spherical. Mr. Moseley's plant has the latter character.

TURBINARIA VULGARIS, *J. Ag.*

DICTYOTACEÆ.

PADINA PAVONIA, *L.*

HELMINTHOCLADIEÆ.

ACTINOTRICHIA RIGIDA, *Dne.*

CRYPTONEMIACEÆ.

GRATELOUPIA FILIFORMIS, *Ktz.*

CERAMIACEÆ.

CENTROCERAS CRYPTACANTHUM, *Ktz.*

SIPHONACEÆ.

HALIMEDA OPUNTIA, *Lamx.*

VALONIACEÆ.

VALONIA —— ?

Probably *V. cladophora*, Ktz., but too imperfect.

ULVACEÆ.

ENTEROMORPHA COMPRESSA, *Grev.*, var. **TRICHODES**, *Ktz.*

FUCACEÆ.

CLADOPHORA PATENTIRAMEA, *Mont.*

(9) *Supplement to preceding Collections.*

"A calcareous Alga in rounded masses forming the bottom in 10 fathoms off Great Island (Santa Cruz Major), Zamboanga. The dredge came up filled with these masses."

LITHOTHAMNION POLYMORPHUM. *L.*

Remarks on the Superposed Arrangement of the Parts of the Flower. By MAXWELL T. MASTERS, M.D., F.R.S., F.L.S.

[Read June 15, 1876.]

I. *Prefatory Remarks.*

THE alternate arrangement of the parts of the flower is so general that any exceptions to it are invested with peculiar interest. In the following paper I propose to allude to some of the real or apparent deviations from the rule, to offer some explanations concerning them, and to cite a few illustrations showing how considerable may be the amount of variation in this particular even among the genera of the same order. It is necessary, in the first instance, to say that for the purposes of this communication the term "superposed" is made use of in preference to the word "opposite," to which objection has been reasonably raised by Steinheil, Payer, and others*.

For conciseness' sake, and to avoid the employment of woodcuts condensed floral formulæ are employed: thus an ordinary pentamerous tetracyclic flower, such a one as Braun calls encyclic, may be represented as follows—

$$\begin{array}{cccccccccc} S & & S & & S & & S & & S & \\ & P & & P & & P & & P & & P, \\ St & & St & & St & & St & & St & \\ & O & & O & & O & & O & & O, \end{array}$$

or, for brevity's sake, as

$$\begin{array}{cc} S\,5 & \\ & P\,5 \\ St\,5 & \\ & O\,5, \end{array}$$

the S representing the sepals, P the petals, St the stamens, O the ovaries or carpels, while × may stand for a staminode, and ⌒ for a gland of the disk. Cohesion of the parts of the same whorl may be expressed by a line over the letters; thus $\overline{S\ \ S\ \ S\ \ S\ \ S}$ or $\overline{S}\ 5$ may be taken to represent a so-called gamosepalous calyx of 5 sepals; while $\left|\begin{array}{l} P\,5 \\ \quad St\,5 \end{array}\right.$ may be taken to indicate that the stamens are adherent to the petals.

---

* Payer, 'Eléments de Botanique,' p. 141.

As, for the most part, relations of position are alone discussed in the following remarks, so the figures or symbols referring to number, union, or disunion of parts are in general omitted as unnecessary for the present purpose. Unless otherwise stated, the formulæ here given have been always constructed from personal observation.

Superposition exists in a large number of diverse families. It may suffice to cite a few in which the phenomenon is most frequently met with or in which it is most apparent, *e. g.* :—

Berberidaceæ.
Menispermaceæ.
Cistaceæ.
Malvaceæ.
Sterculiaceæ.
Tiliaceæ.
Hypericaceæ.
Ternstrœmiaceæ.
Guttiferæ.
Sauvagesiaceæ.
Sabiaceæ.
Simarubaceæ.
Vitaceæ.
Rhamnaceæ.
Celastraceæ.
Olacaceæ.
Loranthaceæ ?
Sapotaceæ.
Primulaceæ.
Myrsinaceæ.
Plumbaginaceæ.
Lauraceæ.
Iridaceæ.
Burmanniaceæ.
Restiaceæ.

II. *False Superposition.*

Before considering those cases where true superposition exists, mention must be made of instances of the apparent or false superposition which arises from the decussation or crossing of very closely crowded whorls. Some of the cultivated varieties of Camellia, as "Queen Victoria," and specially "Lady Hume's Blush," afford good examples of this. In these Camellias it often happens that flowers of two different forms are produced. In the commoner case the sepals and petals are disposed in an imbricate or spiral manner, the stamens and carpels being replaced by petals. The arrangement is on the $\frac{1}{3}$ type ; and the outline of the flower is circular. In the other and rarer form the petals and petaloid stamens are so arranged as to form a six-angled, six-rayed, or star-shaped flower. The petals are so evenly placed one over the other, that at first sight it appears as if the petals did not alternate with one another, but were superposed to each other. When, however, the flower is carefully pulled to pieces, it may be seen that the law of alternation is not really interfered with, and that the superposition is apparent rather than real. If the buds be examined, or if the petals be carefully stripped off, it may be seen that the petals, instead of being arranged in a spiral manner, increasing in size from below or beneath upward, are disposed in cycles or whorls, each cycle consisting of three petals. The cycle is probably in this case merely a spiral depressed or undeveloped, owing to the arrest of development of the internodes between successive petals. The members of one cycle alternate in position with those of the next; and so it comes about that the pieces of the third whorl are placed immediately over those of the first, the members of the fourth over those of the second, and so on. The peculiar star-like form and the apparent superposition are therefore due to the substitution of a verticillate or cyclic for a spiral arrangement and to the alternation of parts of successive whorls. The thalamus of the ordinary Camellia flower is largely developed, thick and conical, or more or less dome-shaped; and, on a transverse section, the vascular bundles are seen to form a continuous or more or less broken ring surrounding a central medulla of stelliform cells. The thalamus of the star-like Camellia is more distinctly 6-sided than in the ordinary form, the sides being somewhat concave; and on transverse section the vascular bundles, especially near the upper extremity, may be seen to be arranged in six groups surrounding the central parenchyma. When the theory of chorisis was enunciated by Dunal, it met with great opposition, and, in this country, especially from Lindley. One of the arguments used by this eminent botanist in his 'Elements of Botany' (1847), p. 76, figs. 157, 158, was derived from the star-like Camellia to which allusion has just been made. Lindley assumed that the advocates of the theory of chorisis would consider this Camellia an illustration of their views. From the appearances presented on a superficial examination, it would not be unnatural to suppose that an upper petal placed apparently directly over a lower one was derived from the latter by the process of chorisis. Against such a supposition, Lindley argued that it was unreasonable to suppose that on one and the same individual plant the arrangement of the parts of different flowers should be different. It seemed to him contrary to nature that two diverse plans of floral construction should be followed in the same plant; and he therefore expressed his opinion that the example afforded by this Camellia "seems conclusive against reduplication having any existence in nature." No doubt Lindley was right in denying the existence of chorisis in this particular instance, though he does not appear to have perceived on what the peculiar appearance which mimicked chorisis really depends.

The arrangement just alluded to, of decussating whorls, is, as is well known, a very common one. It is well seen in the case of the stamens of *Aquilegia*, which, as shown in the diagram given in the text-books, has the stamens arranged in ten ranks, those of one rank alternating with the next, and so on. In some Berberidaceæ (as in *Epimedium*), Guttiferæ[*], Menispermaceæ (e. g. *Sychnosepalum*), some Lauraceæ, etc. the apparent superposition of parts may be explained on similar principles.

An appearance of superposition is also sometimes brought about by the circumstance that portions of the same phyllome are placed one above the other, as in the case of the divided stamens of Mallows. If a young flower of *Malope* be examined, the anthers may be observed as if arranged in ten vertical rows, there being in reality five branched stamens, each stamen with two marginal rows of anthers.

III. *True Superposition.*

This occurs in many different manners, and depends on various causes. Certain actual, or at least possible, modes of arrangement may here be cited, with illustrations. Other examples, together with the discussion of the causes producing them, will be given in the sequel.

1. Sepals superposed to sepals, as in flowers where there is a pleiotaxic calyx (Veg. Teratol. p. 371), as represented by the formula

S
S
S.

2. Petals superposed to sepals, thus—

S
P.

Planchon says such superposition may be considered a general rule in Cistaceæ (Bull. Soc. Bot. France, ix. 507).

3. Petals superposed to petals, as in pleiotaxic corollas—

S
P
P.

---

[*] See Aug. de St.-Hilaire, Morphol. Végét. 612; Planchon et Triana, Ann. Sc. Nat. sér. 4, xvi. p. 276.

It is doubtful whether or not some Sauvagesiaceæ should be included under this category*. In *Salvertia convalliodora* the staminodes are superposed to the petals and in *Rawsonia*, according to Harvey, Thes. Cap. xxxi., the disposition is

S
P
×
Sts.

If the calyx were pleiotaxic and its elements superposed, we might get such a formula as

S
S
P
P,

and so on.

4. Stamens superposed to petals, of which the simplest arrangement is

S
P
St.

This is met with in *Rhamnus*, *Vitis*, *Thomasia*, *Hermannia*, *Picramnia*, *Picrolemma*, and a large number of plants of various orders. In *Platytheca* there are two rows of stamens, the outer anteposed to the petals, the inner to the sepals—a most unusual arrrangement.

S
P
St
St.

In *Commersonia* a similar disposition exists; but the inner row of stamens is here represented by staminodes.

In *Nitraria* we often meet with two stamens before each of the five petals thus

S
P
St St
St,

the double stamen being probably the result of lateral chorisis.

---

* For details relating to the very interesting structure of this order see Eichler in 'Flora Brasiliensis,' "Sauvagesiaceæ."

5. Stamens (or scales) superposed to stamens as, in *Cuscuta*—

$$\begin{array}{ll} \mathrm{S} & \\ & \mathrm{P} \\ \mathrm{St} & \\ \times & \end{array}$$

and in some Laurels (*Cassytha* etc.)

$$\begin{array}{l} \mathrm{St} \\ \mathrm{St} \\ \mathrm{St}. \end{array}$$

In some Lauraceæ, as in certain species of *Oreodaphne*, *Cassytha*, etc., there are two rows of stamens, the inner superposed to the outer, and having extrorse anthers, while the anthers of the outer row of stamens are introrse.

6. Stamens superposed to petals and to sepals—

$$\begin{array}{l} \mathrm{S} \\ \mathrm{P} \\ \mathrm{St}. \end{array}$$

7. Carpels superposed to stamens,

$$\begin{array}{ll} \mathrm{S} & \\ & \mathrm{P} \\ & \mathrm{St} \\ & \mathrm{O}, \end{array}$$

as in *Iris*, *Crocus*, etc. A similar formula would apply to the female flower of *Sedum Rhodiola*, substituting a gland (which is here an enation) for a stamen.

8. Carpels superposed to stamens and petals,

$$\begin{array}{ll} \mathrm{S} & \\ & \mathrm{P} \\ & \mathrm{St} \\ & \mathrm{O}, \end{array}$$

as in *Gordonia* (*fide* Le Maout and Decaisne, Gen. Syst. ed. Hooker, p. 271), *Cathedra*, and some Menisperms, while in *Zygophyllum* the arrangement is

$$\begin{array}{ll} \mathrm{S} & \mathrm{P} \\ & \mathrm{St} \\ & \times \\ & \mathrm{O}. \end{array}$$

9. Carpels superposed to stamens, petals, and sepals—

$$\begin{array}{l} \mathrm{S} \\ \mathrm{P} \\ \mathrm{St} \\ \mathrm{O}, \end{array}$$

The arrangements from 4 to 9 inclusive may be complicated with pleiotaxy of one or all the whorls, which probably takes place in some double flowers. Berberidaceæ afford illustrations of this, as in *Epimedium*, the formula for which is

S
P
P
St.

The arrangement in this case, however, is due to an alternation of decussating whorls.

Usually in such cases the stamens and carpels, either or both, are more or less petaloid, or actually replaced by petals, so that their true nature is not at once obvious. In some Menispermaceæ, e. g. *Cissampelos*, *Cyclea*, etc., we have an arrangement as follows—

S
P
O,

the stamen, or stamens, being abortive or replaced by carpels in like numbers and position. Similarly in the male flower we have

S
P
St,

the carpel being deficient*.

IV. *The Causes of True Superposition.*

1. *Superposition of Whorls.*—Payer, in his 'Éléments de Botanique' (1847), p. 42, says that in the case of verticillate leaves, the leaves of a verticil are never superposed to those of the whorl immediately beneath, and that opposite leaves are in the same case. This remark can hardly be applied in the case of the flower, in which (in exceptional instances) the members of one verticil may be, to all appearance, placed immediately above those of the whorl beneath. It is possible that an examination in the earlier stages of the development of the plant might show that in their origin the primordial tubercles are not placed exactly over one another; but in the adult condition, and for all practical purposes,

---

* For details relating to the position of parts in the flowers of Menispermaceæ, see Miers, 'Contrib.' vol. iii.; Eichler, in Martius 'Flora Brasiliensis' (Menispermaceæ). *Abuta*, *Sychnosepalum*, *Cocculus*, *Cissampelos*, &c. See also for general details A. P. De Candolle, 'Théorie Elémentaire,' p. 153.

superposition of whorls does really occur. A marked instance of this is afforded by the monstrous Daffodil called in gardens *Narcissus Eystettensis.* This Narcissus is mentioned in Mr. Burbidge's monograph on Narcissus, where references to Herbert and Haworth are given. It is also well figured in the work just cited*, and was described by several of the older botanical writers, whose descriptions are noteworthy as showing that the morphological peculiarities of the plant were recognized by those observers†.

There are also other monstrous Daffodils in common cultivation in the country with a similar arrangement of parts, although from various mutations and substitutions of one organ for another the true position of the parts is not at once obvious. Such a one was described by the late Professor Morren*. The deviation from the ordinary alternate arrangement in the case of these Narcissi, and more especially in the case of that form called *N. Eystettensis,* arises from a different cause from that to which the appearances of the Camellias previously referred to are attributable. While in the Camellia the superposition is, as we have seen, apparent rather than real, in the Narcissi there is a true superposition of parts. The flower in question, *N. Eystettensis,* has a

---

* Burbidge, 'The Narcissus,' etc., with coloured plates of all known species 1875, p. 27, tab. x. D.

† Lobelius (1581) figures the plant under the name *Narcissus luteus multiplici flore* in his Plantarum seu Stirpium Icones. His figure was apparently copied by many later authors.

Dodonæus, in his Stirpium Historiæ Pemptadis secundæ lib. ii. p. 227, c. icon. (1583), describes and figures the same plant under the title *Narcissus silvestris multiplex*, and also alludes to a double white Narcissus to be hereafter mentioned. "Contingit vero," says Dodonæus, "et huic quod aliis quandoque floribus et candidis Narcissus, accidit ut, videlicet, floris foliola multiplicentur et talis quidem flos medio calyce caret compluribus foliolis medium occupantibus. Folia autem ac bulbi cum alternis conveniunt; flos quoque totus luteus."

Dalechamp, Hist. Gen. Plant. ii. p. 1523 (1586), also alludes to the plant as *N. luteus multiplex* Dodonæi.

Our own Gerard, writing in 1597, in his Herball, p. 115, gives a figure (apparently reproduced from Dodoens or De l'Obel) of the double yellow Daffodil, which he says he received from Robinus, of Paris, who procured it by means of friends from Aurelia and other parts of France.

Clusius (1601) figures in his Rariorum plantarum Historia, p. 110, the Narcissus of which we are now speaking under the head of *Pseudo-Narcissus pleno flore* . . . . "medio calyce caret, et ejus loco plurima folia externis illis omnino similia et pallida habet." By "calyce" the author means what we should now call the corona. A similar variety probably of what is now known as *Narcissus poeticus* is mentioned by the same author as *Narcissus plenus flore albo.*

Besler, in his 'Hortus Eystettensis,' (1613) tertius ordo, fol. 3, ii., gives an excellent figure of this Narcissus under the name of *N. silvestris stellatus,* with this description:—"Qui decussatis florum foliis, uno caule prodit acutioribus sub luteis *N. silvestris* et *stellatus* hic nominatur inodorus, habens oblonga carinata rotundiora et angusta folia; bulbum cepaceum."

Tabernæmontanus, in 1625, repeated Clusius's figure and mentioned the plant as "Josephstäblen." The same author in his Nieuw Kreuterbuch, lib. 2, p. 1003 (ed.

1664), mentions the plant in question under the name "Gefullt' Jacobstäblen," and as *Narcissus silvestris multiplex calyce carens.*

Parkinson, in his Paradisus (1629), p. 105 and p. 107, fig. 4, speaks of it as "*Pseudo Narcissus gallicus minor flore pleno,* or the lesser French double bastard daffodil," and states that it bears "one faire double flower thereon, of a pale yellow or lemon-colour, consisting of six rowes of leaves, every one growing smaller than other unto the middle, and so set and placed, that every leafe of the flower doth stand directly almost in all, one upon or before another unto the middle, where the leaves are smallest, the outermost being the greatest, which maketh the flower seeme the more beautifull; this and the greater kinde hath no trunke [corona] or shew of anything in the middle, as all or most of the other former bastard daffodils have, but are flowers wholly composed of leaves standing double even to the middle." Further on it is added that this "French double kinde [grows] about Orleance in France, where it is said to grow plentifully and is most usually called 'Robinus his Daffodill.'" The modern French Floras make no mention of the plant in a wild state. Parkinson, 'Paradisus,' p. 89, f. 6, and p. 91, also alludes to the double white form already mentioned as "bearing one faire double snow white flower, very like in the fashion unto the pale yellow double Daffodill or bastard Daffodill of Robinus * * * for it is in the like manner laid open flat, and composed of six rowes of leaves, every rowe lying in order just opposite or one before another, etc." The name he gives to this is *Narcissus albus flore pleno Virginianus,* or the double white Daffodill of Virginia. If a Narcissus at all, it is probably a form of *N. poeticus.*

J. Bauhin, 'Historia Plant. Universalis' (1651), p. 594, speaks of the plant now known as *N. Eystettensis* as *Bulbocodium flore pleno,* and repeats the figure of Dodonæus and Lobelius.

In Hales's 'Eden, or a compleat body of Gardening' (1757), the present plant is described and figured as the Double Lemon Daffodill, the author giving an original illustration and avoiding the error of some of his predecessors, who supposed it to be a wild species, instead of an accidental monstrous condition perpetuated by cultivation. Philip Miller makes no mention of this variety in the eighth edition of his celebrated Dictionary.

* Bull. Acad. Roy. Belg. xx. pt. 2, p. 272, c. tab. The author here cited says, "L'opposition des organes pétaloïdes est ici de toute évidence; de sorte que si l'on admet le principe de M. Auguste de St.-Hilaire, ces cinq périanthes et ces cinq couronnes emboîtés les uns dans les autres seraient les résultats non de multiplications, mais bien de vrais dédoublements." See also Sweert, 'Florilegium' (1641), t. 26.

very short funnel-shaped flower-tube, from the edge of which six segments are given off, not three followed by three as in the normal flower. Within these six, and superposed to them, are six others; to these succeed in like manner as many more, and so on for many series. In the case of *N. Eystettensis* the corona is absent, as are also the stamens and pistil; but in the other double Narcissi, to which reference has been made, the corona is repeated, and the centre of the flower is occupied by a confused mass of imperfect and partly petaloid stamens and styles. The ovary, which is usually adnate to the tube of the flower (inferior), is in these flowers absent. The appearances presented, therefore, are due to a repetition of the perianthial whorl, to the complete or partial exclusion of the stamens and other parts of the flower. Further examination of very young buds is requisite before it can be stated definitely whether in this particular instance the repetition of parts is due to chorisis of preexisting organs, or to a distinct series of new growths from the receptacle. So far as I have seen, I am disposed to believe that the latter is the true method according to which these flowers are constructed.

Real superposition of whorls is also met with in some Olacaceæ (as in *Cathedra*),

S
P
St
O,

and in some Menisperms (*Cyclea*) represented by the formula

S
P
St

or, as in *Cissampelos**,

S
P
O.

Perhaps also the prevalent arrangement in Restiaceæ, where the three stamens are superposed to the three inner perianth-segments, may be referred to the same cause.

S
S
St 3
O 1–3

At any rate analogy affords no indication of the abortion of an outer row of stamens in these plants.

---

* For Menispermaceæ see Miers, 'Contrib.' vol. 3; Eichler, in Martius, 'Flora Brasiliensis; Olacineæ, see Miers, 'Contrib.' vol. 1; Engler in 'Flora Brasiliensis;' and Mast. in Hook. Fl. Brit. India, i. p. 572.

The arrangements in *Lardizabala* and *Holbœllia*,

S
P
St,

and *Epimedium*,

S
P
P
St,

may be attributable to the same cause or to chorisis*.

2. *Spiral arrangement of parts.*—In these cases the calyx forms a complete cycle followed by the corolla in the same manner. An illustration of this may be seen in the case of *Sabia*, wherein the sepals of the calyx are arranged on the $\frac{2}{5}$ plan, and the petals also; hence the first petal is over the first sepal, the second petal superposed to the second sepal, and so forth. Such flowers would fall under A. Braun's definition of hemicyclic. It may be well in this place to allude, in passing, to Payer's explanation of the passage of the decussate arrangement into the $\frac{2}{5}$ plan by the mere chorisis of one leaf, and to the views of the Rev. George Henslow (Trans. Linn. Soc. 1875, Botany, i. p. 37). The latter author deduces the spiral arrangement from opposite and decussate leaves.

3. *Enation, Chorisis.*—By Pfeffer † the petals of primroses are supposed not to be autonomous organs, but outgrowths from the stamens; hence the superposition of the latter to the former. The structure of *Samolus* and of *Monotheca* (Le Maout and Decaisne, *l. c.* pp. 530, 533), as also of *Jacquinia* and *Clavija*, in Myrsinaceæ, with their rows of abortive stamens, by means of which the symmetry is restored, is contrary to the view advocated by Pfeffer. Again, though it is true that in young buds the stamens are seen to

---

* In some double varieties of Columbine (*Aquilegia*) grown in gardens from time immemorial, there is true superposition, the tubular petals being not only multiplied but ensheathed one within the other, or as the French say "emboités," like a "nest" of pill-boxes. There are other varieties in which petals are either not present or wherein they are represented by flat sepals arranged in like manner as in the Starry Columbines of the older writers, so called because the leaves of the flowers do stand so directly one by another. Where the overlapping is only partial, the term Rose Columbine is given (see Parkinson, 'Paradisus,' p. 272).

† In Pringsheim's Jahrbuch, vol. vii. p. 194.

be in advance of the petals, that appearance is due to the growth of the stamens overtaking that of the petals, and not to any outgrowth from the stamens. For instance, in *Lysimachia vulgaris*, as in some other Primulaceæ, I find that in the course of development the petals lag behind the stamens, and hence allow more room for the development of the latter. The pistil is developed in the shape of a cylindrical tube, and shows no sign of cohesion of carpels, but rather of a lack of separation of those organs. In some cases, however, the carpels do become separated.

A similar explanation to that given by Pfeffer in the case of Primroses has been offered with regard to some Hypericaceæ and Plumbaginaceæ; and by others in the case of those Malvales wherein the stamens are antipetalous, but, as it would seem, on questionable grounds. The history of development, so far as known, and the analogies with the structure of other Malvales render it more probable that the superposition is due to abortion or to some other cause rather than enation*.

The peculiar position of the styles of *Aristolochia*, superposed to the stamens, is explained by Payer on the supposition that the styles are mere outgrowths from the stamens to which they are superposed. (See Mast. in Journ. Linn. Soc. xiv. p. 488.)

It seems desirable to draw a distinction between Enation and Chorisis, although in the adult flower the difference between the two processes may not be always obvious †. By the process of chorisis the original organ is repeated, petal follows petal in the same way that the leaves of a book do. The process begins at a very early stage of development; and it is often difficult to ascertain whether the younger growths are independent productions from the floral axis, or secondary growths from the preexisting lateral organs. In the case of enation the process is subsequent to the first stages of development; development has made some progress before the outgrowth is observed. In the case of chorisis, the organ is repeated; in enation it generally happens that the new growth is of a different appearance from, and frequently has a different office to fulfil than that of, the part from which it springs. The scales before the petals in *Silene*, in *Corokia*, and in many Sapindaceæ probably, in some cases certainly, owe their origin to enation. The female flower of *Sedum Rhodiola* has a formula as follows—

---

* Van Tieghem (Recherches sur la structure du pistil, p. 14) considers that the petals of Mallows are stipulary appendages of the staminal leaves; so that, according to him, there are but two whorls in a mallow-flower—a sepaline whorl which bears both stamens and petals, and a carpellary whorl opposite to the sepals. See also this author's translation of Sachs's Traité, p. 622.

† Mast. Vegetable Teratology, p. 343, 443.

$$\begin{array}{ll} S & \\ & P \\ \times & \\ O, & \end{array}$$

from which it might be inferred that the scales × were representatives of an outer row of stamens, the second row (antipetalous) being supposed to be abortive. An examination of the flower in a young state shows, however, that the scale is a mere outgrowth or enation; for in the unopened bud it is very small, but increases rapidly as the flower opens, and serves as a honey-secreting organ.

Assuming, by way of illustration, that the petals of Primroses and of Plumbaginaceæ are formed as outgrowths from the stamens, they would afford illustrations of the process of enation, as do also the corona of Passion-flowers, the outgrowths from the surface of petals in various Caryophyllaceæ and Sapindaceæ, the appendages to the anthers in Asclepiadaceæ, &c. These outgrowths may occasionally assume the form of stamens; but, for all that, their mode of production may still be by enation rather than by independent formation. In a particular form of *Datura*, figured in my 'Vegetable Teratology,' p. 450, the arrangement of the parts was as follows—

$$\begin{array}{ll} \overline{S\,5} & \\ & \overline{P\,5} \\ & \times 5 \\ & \overline{P\,5} \\ St\,5 & \end{array}$$

Here the inner row of petals may have been formed by chorisis, while the petaloid outgrowths × were the products of enation from the outer surface of the inner petals, similar to those sometimes met with on the under surface of leaves.

4. *Abortion.*—Superposition is perhaps most frequently brought about by abortion or suppression of intermediate whorls. This is obvious in the case of *Vitis*, where the stamens are superposed to the petals, a second and outer row of antisepalous stamens being represented by five glands of the disk, as shown by the formula

S 5
P 5
⌒ 5
St 5.

Owing to the abortion of the petals in Amaranthaceæ, Chenopodiaceæ, Urticaceæ, Santalaceæ, &c., an appearance of superposition of the stamens is brought about, though in truth this is in these cases their natural position.

In *Seetzenia* the arrangement, according to Le Maout and Decaisne, Gen. Syst. ed. Hook. p. 303, is

S 5
St 5
O 5,

owing probably to the abortion or suppression of a row of petals. Abortion or suppression of an outer row of stamens will probably account for the position of the stamens in the Apostasiaceæ and Burmanniaceæ.

5. *Pleiomery.*—When the members of successive whorls are not equal in number, but anisomerous, some of the additional parts must necessarily be superposed to others in the preceding whorls; thus in *Nigella*, where within a calyx of five sepals is a row of ten petals, some of those petals must be more or less superposed to the sepals. In *Casearia*, where there are no petals, but a calyx of five sepals, the staminal whorl may be thus represented—

S 5
St 10 × 10.

The formula for *Byrsanthus epigynus** is

S 5
P 5
× St × St
× St.

In such cases it becomes necessary to inquire to what cause the polymery is due. It may arise from branching of the stamen chorisis, or from interposition of parts. Cases of this kind occur in *Erythroxylon*, *Oxalis*, *Malpighia*, *Zygophyllum*, *Quassia*, *Melia*, many Sapindaceæ, Saxifragaceæ, Crassulaceæ, Francoaceæ, *Dionæa*, some Combretaceæ, Melastomaceæ, Ericaceæ, *Hypopitys*, *Bougainvillea*, *Tetragonia*, *Phytolacca*, *Alisma*, *Butomus*, etc.

---

* Mast. in Journ. of Linn. Soc. vol. xiii. p. 15.

6. *Interposition.*—In some of the cases last mentioned, as in *Rhododendron* and its allies, in Geraniales, *Dictamnus, Acer,* &c., subsequent to the formation of the primary stamens a secondary production of stamens is observed to take place. Sometimes these secondary stamens are in equal number with those first developed; at other times they are fewer in number. In the last instance it frequently happens that a stamen gets placed in front of a petal. The proper relative position of the carpels remains unaffected in most of these cases. Although much stress was laid on this phenomenon of interposition by Payer, whose views have been adopted by Sachs and others, yet it is a question whether some of these cases, *e. g.* in Geraniales, are not better explained on the supposition that the new growths are subdivisions of the primary stamen, as in Malvaceæ or *Hypericum.* See also the diagram of *Styrax* in Le Maout and Decaisne's Gen. Syst. ed. Hooker, p. 451, with its single row of isolated stamens, twice the number of the petals, and compare this with the figure of *Symplocos* with its branched stamens. By Chatin and Eichler * plants with a double andrœcium, the outer whorl of which is superposed to the petals, are styled "obdiplostemones." The outer stamens in these cases are regarded as outgrowths from the petals or as intercalated elements. Chatin further explains some of these instances by showing that while in the adult flower the stamens are in one row, in the young state they are in two.

7. *Substitution of one organ for another.*—The diagram for the female flower of *Xanthoxylum* shows the five carpels superposed to the five sepals, thus—

S 5
O 5.

In the male flower, according to the diagram in Le Maout and Decaisne's 'General System of Botany,' ed. Hooker, p. 324, the arrangement is

S 5
P 5
St 5
×.

It would seem, therefore, in this case as if the stamens in the female flowers were really replaced by carpels, the latter occupying the position that stamens ordinarily fill, and which they do really occupy in the male flower.

---

* Eichler, 'Blüthendiagramme' (1875), p. 187; Chatin, 'Comptes Rendus,' 1856, p. 13, ex Eichler, *l. c.*

8. *Torsion of the axis.*—This between two successive whorls, or torsion of the constituent elements of the whorl, may bring about an appearance of superposition. Such cases are not uncommon in the case of leaves; but I do not recall any instance in the case of the normal flower, except in certain cases of obvious monstrosity, as where the parts of the flower are displaced by a twisting of the axis, conjoined or not with a tendency of the parts to pass from a verticillate to a spiral arrangement*.

V. *Objects of the Diversities in mode of Arrangement.*

The alternate position seems to be in most instances a provision for ensuring space to closely packed organs, so as to prevent undue amount of pressure on the growing tissues. In cases where the development of the stamens lags behind that of the petals, the question of space is not of so much moment as under other circumstances. It may often be an advantage to the plant to have the stamen concealed in the cavity of the petal, as in *Blumenbachia* among Loasaceæ, *Scaphopetalum* in Byttneriaceæ, and in very many other instances, where such an arrangement may be beneficial either for protection's sake or in various manners connected with fertilization.

In other cases the existing arrangement may be a relic of some ancestral condition which has now lost its significance; or, on the other hand, could we but read it aright, it might offer a forecast of some future development.

VI. *Illustrations of the Relative Position of the Parts of Perianth and Andrœcium in various genera of* Tiliaceæ *and* Olacaceæ.

1. *Tiliaceæ.*—In illustration of the manner in which the relative position of the parts of the flower may vary within the limits of the same Natural Order, I may refer to some of the genera of Tiliaceæ and Olacaceæ which have come under my own observation. Other instances of a similar character relating to Malvales are specified in a paper published in the Journal of this Society †.

In Tiliaceæ in general the stamens are indefinite in number, but are probably originally referable to five branched stamens, with or without staminodes, in a single or double whorl. The staminodes may be independent structures; but usually they are sterile portions of a branched or compound stamen.

---

* Some instances of this, especially amongst Orchids, are given in 'Vegetable Teratology,' p. 91 &c.

† "On some Points in the Morphology of the Malvales," Journ. Linn. Soc. vol. x. p. 18. See also Mast. in Oliver's 'Flora of Tropical Africa,' i. p. 177 (Malvaceæ, Sterculiaceæ, Tiliaceæ); and in Hook. Fl. Brit. India, i. p. 317.

In *Prockia* the arrangement is

S
Sts,

the superposition of the stamens being apparent rather than real, owing to the abortion or suppression of the petals.

A very frequent arrangement is that met with in *Glyphæa*, *Entelea*, *Triumfetta*, *Heliocarpus*, *Erinocarpus*, *Sloanea*, *Grewia*, *Corchorus*, *Desplatzia*, as also in *Kydia* among Malvaceæ:—

S
P
Sts.

Luhea only differs from this in the presence of a row of staminodes outside the stamens, thus—

S
P
× ×
Sts,

the staminodes being probably, therefore, simply sterile divisions of the stamen.

In *Hasseltia* and *Plagiopteron*, as in *Malope*, *Bombax*, *Eriodendron*, *Durio*, &c., among Malvaceæ, the stamens are superposed to the petals thus—

S
P
Sts;

and the same arrangement holds good in the case of *Commersonia* and *Pentace*, with the addition of a row of antisepalous staminodes within the fertile stamens.

In *Aristotelia*, as in *Sidalcea*, among Malvaceæ, there are two rows of stamens thus arranged—

S
P
Sts
Sts,

the typical alternation being here not interfered with. *Brown-*

lowia is similar, except that the row of fertile stamens is here represented by five antipetalous staminodes, thus—

S
P
Sts
×.

Pityranthe differs from *Brownlowia* in the circumstance that the staminodes are superposed to the sepals—

S
P
Sts
×.

Corchoropsis has a third row to the andrœcium in the shape of an innermost row of five staminodes superposed to the sepals—

S
P
Sts
Sts
×.

Bocquillon, however, states that the staminodes are antisepalous*.

In some species of *Elæocarpus*, as in *E. parviflorus*, as also in the genus *Tilia* itself, the arrangement is as follows—

S
P
St
×
St
O.

In *Leptonychia*, formerly referred to Tiliaceæ, but now more fittingly placed among Byttneriaceæ, the disposition is as follows—

S
P
× ×
St St
×.

---

* In many cases the *outer* surface of the staminodes is dusted over with pollen in spite of the anthers being extrorse, which leads to the inference that the function of the staminodes corresponds with that of those organs in *Dombeya Mastersii*. See 'Gardener's Chronicle,' 1864, p. 14; Bot. Mag. t. 5639.

In *Sparmannia* the arrangement is similar, except that the fertile stamens are more numerous, and, together with the staminodes, are antisepalous, not antipetalous.

In *Honckenya* the arrangement, according to Bocquillon*, is

S
P
× ×
St St
St.

The same author gives the following arrangement to *Tilia*—

S 5
P 5
St 5
St 5
O 5.

The diversities in the relative position of the floral envelopes and of the parts of the andrœcium in Tiliaceæ seem therefore to be associated with abortion and suppression of petals, suppression or multiplication of stamens, or with subdivision of the individual stamens—some of the branches being fertile, others anantherous. But all these matters require to be investigated in fresh flowers and in various stages of development. This remark applies even more forcibly to the Olacaceæ.

2. *Olacaceæ.*—It must be premised that this order, as understood by Bentham and Hooker, is a rather heterogeneous conglomerate of genera, and that doubtless in course of time considerable rearrangement will be found necessary; indeed this has already been partially effected by Miers, Baillon, and others†.

From the peculiarities of structure and arrangement in this order, from the occasional uncertainty as to what is to be considered calycode and what calyx, from the difficulty of accurately determining the relative position of the parts in pressed and dried flowers, from the few opportunities presented to the home botanist of examining fresh specimens of this order in gardens, and from other causes, it is unsafe to rely on the diagrams and descriptions given by descriptive botanists, whose attention has not been specially called to the question of relative position.

---

* Bocquillon, 'Mém. sur le Groupe des Tiliacées,' 1867, p. 18.

† Miers in Lindley's 'Veg. Kingdom,' p. 444, and 'Contrib. to Botany,' i. p. 34; Baillon, 'Adansonia,' iii. 354; Engler in Martius, 'Flora Brasiliensis' (Olacineæ). See also Masters in Hook. Fl. Brit. India, i. p. 572.

For the purposes of this communication it matters relatively little whether the genera called Olacaceous are closely allied or not in their genetic affinities, as abstract relations of position are the main subjects now under consideration. This being the case, it is not necessary in the formulæ made use of to indicate any differences of adhesion, cohesion, or (except in some cases) number of parts. The position of the loculi of the ovary is also, in general, not indicated—because in most instances there is only a single cavity in the adult flower, or, if there be more than one, then it is difficult, if not impossible, among Olacaceæ, accurately to determine the relative position of the ovarian cavities from dried specimens. In *Emmotum*, according to Miers, there are three ovarian cavities, with indications of two others.

The simplest formula for this order is

S 5
St 5,

which is met with in *Lepionurus*, where we have a calyx of five sepals with five stamens superposed. That the superposition in this genus is due to suppression of the petals may reasonably be inferred from the fact that one of the most common of all floral arrangements is

S
P
St ;

and this is found in many Olacaceous genera, such as *Mappia*, *Lasianthera*, *Gomphandra*, *Cardiopteris*, *Apodytes*, *Pteleocarpa*, *Phlebocalymna*, *Sarcostigma*, *Phytocrene*, *Miquelia*, &c.

The arrangement

S 5
P 5
St 5

occurs in *Aptandra*, *Agonandra*, *Strombosia*, *Schœpfia*, *Iodes*, and *Anacalosa*, and may, possibly, be accounted for by reason of the absence or suppression of an outer antisepalous series of stamens. In *Opilia* the arrangement is similar; but there is in this genus a row of staminodes superposed to the sepals and within the stamens—

S 5
P 5
St 5
× 5
O 1.

Where there are four rows of parts, the arrangement is as just described; or it may be as follows—

S
P
St
⌒,

as in *Phlebocalymna*, where the antipetalous glands of the disk may be the representative of an antipetalous whorl of stamens.

In *Natsiatum* we meet with the arrangement

S 5
P 5
× 5
St 5,

there being in this genus a row of staminodes antipetalous and outside the fertile stamens. Baillon, indeed, describes the staminodes as "interposed" between the fertile stamens, thus—

S 5
P 5
St 5 × 5.

But in the flowers examined by myself the sterile stamens appeared to be distinctly external to the fertile ones. It is possible, however, that the history of development may bear out Baillon's interpretation.

In the preceding examples (if the last one be excepted) the stamens, staminodes, and glands of the disk are isomerous with the petals in their respective whorls; but in other Olacaceæ we get in the same whorl a larger number of stamens, or of stamens mingled with staminodes than of petals. The formula for *Ximenia*, *Ctenolophon*, and *Ptychopetalum*, for instance, is

S
P
St St,

there being usually ten stamens in a single whorl, five being antisepalous and five antipetalous. In *Ctenolophon*, as the five antipetalous stamens are longer than those superposed to the sepals, though all in the same row, it is possible that one set of five is interposed between the others. There is, however, little or no evidence in support of this opinion.

In the genus *Olax* itself the arrangement varies in different species: thus in *O. zeylanica* and *O. scandens* the arrangement is sometimes

$$\begin{array}{cc} \mathrm{S} & \\ & \mathrm{P} \\ \mathrm{St} & \times; \end{array}$$

and at other times, especially in the last-named species, it is

$$\begin{array}{cc} \mathrm{S} & \\ & \mathrm{P} \\ \times & \\ & \mathrm{St}; \end{array}$$

while Roxburgh, in his 'Coromandel Plants,' figures it as

$$\begin{array}{ccccccccc} \mathrm{S} & & \mathrm{S} & & \mathrm{S} & & \mathrm{S} & & \mathrm{S} \\ & \mathrm{P} & & \mathrm{P} & & \mathrm{P} & & & \\ \mathrm{St} & \times & \mathrm{St} & \times & \mathrm{St} & \times, & & & \end{array}$$

there being, according to this author, three bifid petals and staminodes interposed between the stamens.

In *Olax nana*, *O. acuminata*, and *O. merguensis* the arrangement is

$$\begin{array}{cc} \mathrm{S}\,5 & \\ & \mathrm{P}\,3 \\ \times 5 & \mathrm{St}\,3. \end{array}$$

In *O. Wightiana* the disposition is

$$\begin{array}{cc} \mathrm{S}\,5 & \\ & \mathrm{P}\,5 \\ \mathrm{St}\,3 & \times 5. \end{array}$$

It is possible that the arrangement in *Ptychopetalum* and *Olax* is due to the existence of branched stamens, whereby the number of stamens is increased. This notion is borne out by the order of disposition in *Ochanostachys*, Mast., a newly described genus*, thus—

$$\begin{array}{cccccccccc} \mathrm{S} & & \mathrm{S} & & \mathrm{S} & & \mathrm{S} & & \mathrm{S} & \\ & \mathrm{P} & & \mathrm{P} & & \mathrm{P} & & \mathrm{P} & & \mathrm{P} \\ & \mathrm{St}\,3 & & \mathrm{St}\,3 & & \mathrm{St}\,3 & & \mathrm{St}\,3 & & \mathrm{St}\,3, \end{array}$$

---

* Mast. in Hook. Fl. Brit. India, i. p. 576.

the appearance of three stamens placed in front of each of the five petals being probably due to the branching of five antipetalous stamens.

Further examination, however, especially of fresh flowers, in the earliest stages of development is required before the explanation of the peculiarities in the structure of this, as of many other Olacaceous genera, can be satisfactorily determined.

The union of the calyx to the ovary seems a point of relatively little importance in this order. Sometimes it is partial; and the ovary is then, as it is called, "half superior." At other times it is complete; or in other instances it may not occur at all, when the ovary becomes wholly superior or free. In *Erythropalum* the calyx, which at one period is attached to the ovary, becomes subsequently detached from it; but these are matters beyond the limits of the present communication.

Note on Specimens of *Hibiscus* allied to *H. rosa-sinensis*, L., collected in E. Tropical Africa. By Dr. Kirk, F.L.S., H.B.M. Consul at Zanzibar. With Remarks by Professor Oliver, F.R.S., F.L.S.

[Read June 3, 1875.]

The first specimen of this singular *Hibiscus* was found at Kilwa; it was then leafless and growing on the dry rocky slope of a low hill-range just behind the town. The second was at the bottom of a damp mountain-glen in the Wanika hills behind Mombasa, where it grew in perpetual shade among Bignonias, Balsams, and Ferns. Nothing could have been more dissimilar than the situation of the two specimens, which were moreover separated by about 300 miles of latitude. The same plant, but of which variety I am unable to state, exists, however, at intermediate points; and I have little doubt that the difference of condition indicated by the two localities from which we have the only two specimens is quite sufficient to account for the variation observable in the specimens now made over to Kew.

I think it still an open question whether these can be considered the true wild form, and, again, if *H. rosa-sinensis* be an independent species. The differences seem very remarkable; at the same time we must keep in mind that Africa is now coming to be acknowledged as the true centre of several Asiatic trees and plants, including *Borassus* and the Tamarind.

Remarks by Professor Oliver.

Dr. Kirk's specimens differ from *Hibiscus rosa-sinensis* as we have it in cultivation and in herbaria, in the all but entire suppression of the involucre, the bracts of which are either obsolete or scarcely 1 line in length; in the narrower and more tubular calyx, the limb of which is spathaceously two- to three-lobed; in the deep bipinnation of the widely spreading one-sided petals, the ultimate segments of which are 1–2 lines in breadth; and in the extreme tenuity of the long staminal column. One of Dr. Kirk's specimens is in fruit, the capsule, apparently scarcely mature, being oblong, apiculate, with a thin, almost papery, scabrid-puberulous pericarp, about twice the length of the persistent calyx, which, in this specimen, is at length split to the base. The seeds are rounded and minutely furfuraceous, with faint indication of short setæ.

Fig. 1.

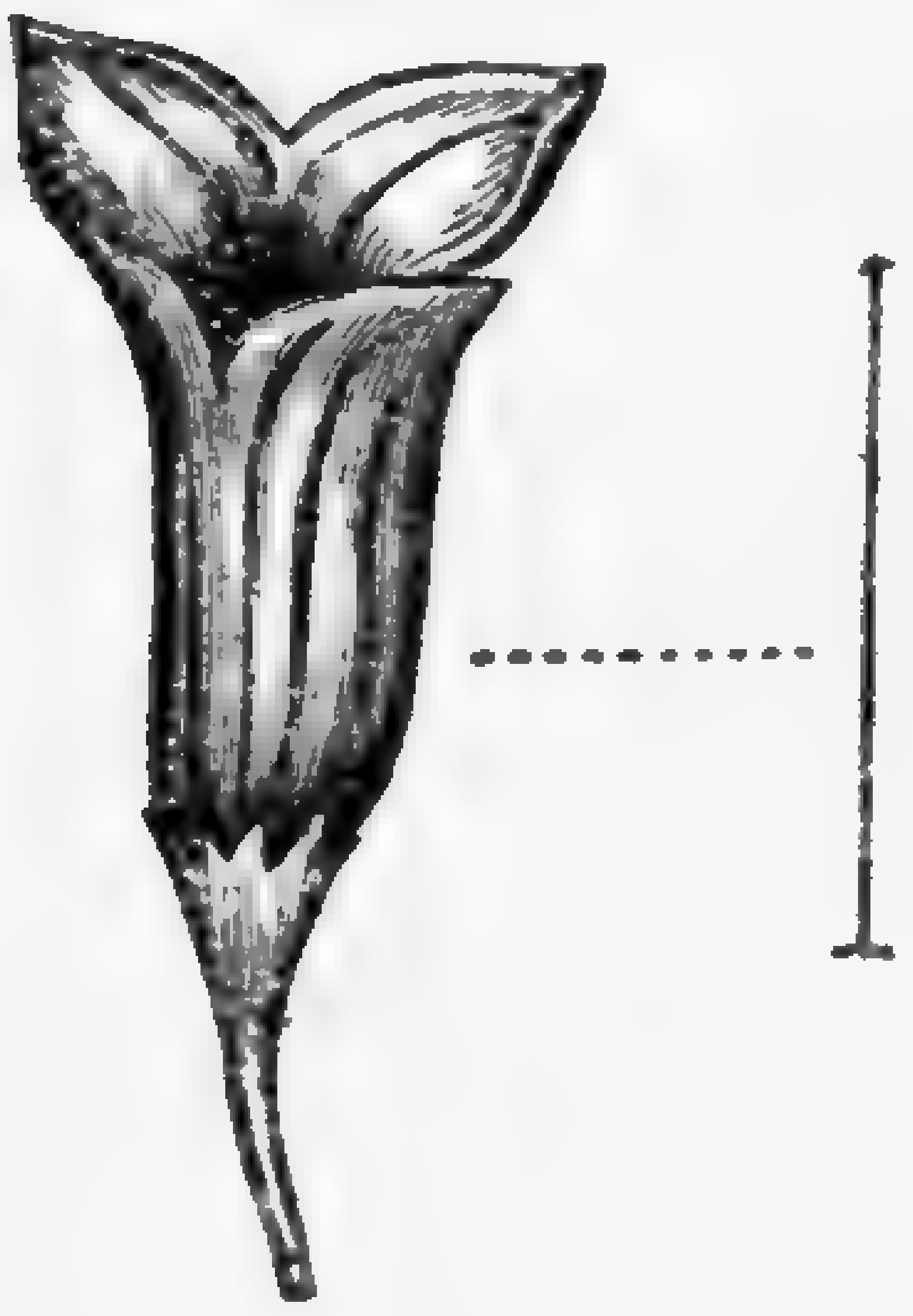


Fig. 2.

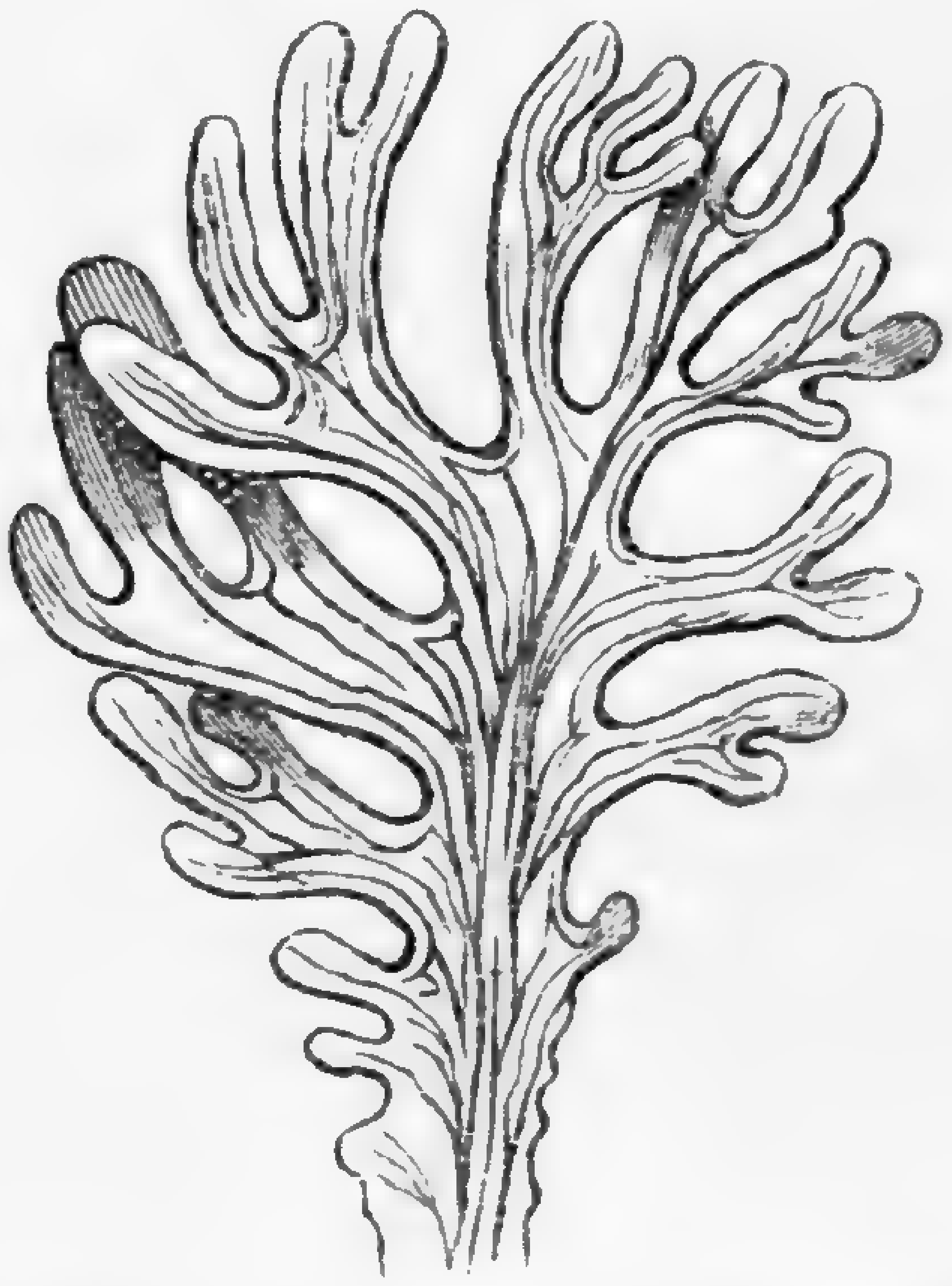


Fig. 1. Calyx with rudimentary involucre, of Dr. Kirk's African *Hibiscus*—enlarged by about one third, the natural dimension being indicated by the vertical line alongside.

Fig. 2. Outline sketch to show its bipinnatifid petal, about nat. size.

So far as I know, *Hibiscus rosa-sinensis* is unkown in the wild state: at any rate I do not find any original record of its occurrence as an indigenous plant; and none of the specimens in the Kew herbarium claim to be wild ones. Dr. Roxburgh says it is wild in Hindostan, though he himself had only found it cultivated (Fl. Indica, iii. 194). Wight and Arnott give no locality in their 'Prodromus Floræ Peninsulæ Indiæ-orientalis,' p. 49, and say the seeds are unknown, and the fruit, they believe, has been described only by Loureiro*.

Dr. Masters, in 'Flora Indica,' i. 344, published last year, says *H. rosa-sinensis* is cultivated in gardens throughout India. He had not seen wild specimens, and cites Loureiro for the fruit-characters.

H. rosa-sinensis has been recently fruited in Scotland by Mr. H. Gorrie, in the gardens of Mauldslie Castle, Carlake, N.B.; and Professor Dyer has kindly brought me specimens "set" by Mr. Gorrie. General Munro, C.B., also has quite lately sent fruits from Barbadoes, where they ripen freely. Specimens of capsules after dehiscence and of the seeds, which are rotundate-reniform, dark-coloured or black, and rough with numerous stout tubercle-based setæ, are now laid before the Society. I do not find any important difference between Dr. Kirk's single fruit and those of the true plant. Dr. Kirk's capsule seems to have been gathered before it was ripe; and the seeds are not sufficiently matured for satisfactory comparison.

It would perhaps be premature, in the absence of matured seeds of the indigenous Tropical-African plant, to express a decided opinion as to its specific identity, or otherwise, with the long-familiar *H. rosa-sinensis*. For my own part, notwithstanding the remarkable divergences between them, I incline to regard them as conspecific.

---

* Fl. Cochinchin. p. 419. "Capsula subrotunda 5-locularis polysperma. . . Habitat tam culta quam spontanea in Cochin China et China."

CONTRIBUTIONS TO THE BOTANY OF H.M.S. 'CHALLENGER.'

XXXVI. Notes on the Flora of Marion Island. By H. N. MOSELEY, Esq., M.A. (Communicated by Professor OLIVER, F.R.S., F.L.S.)

[Read November 16, 1876.]

The centre of Marion Island is in lat. 46° 52′ S., long. 57° 45′ E., that of Prince-Edward Island in lat. 46° 36′ S., long. 37° 57′ E., Lyons being in a nearly corresponding latitude in the northern hemisphere.

The islands are distant from the Crozets (which lie a little to the north or west of them, and are the nearest land) 450 miles. The African continent is distant from them about 960 miles, the nearest point being about Cape Recife at Algoa Bay. From Kerguelen's Land the Marion islands are distant about 1200 miles, from Lindsay and Bouvet islands about 1400 miles, from Tristan d'Acunha and Gough Islands about 2150 miles; and, lastly, from the Falkland Islands and Fuegia (to which, in common with all the other Antarctic islands hitherto examined, except the Campbell and Auckland group, they are in their flora most nearly related) they are distant about 4500 geographical miles.

The islands lie, as do the Crozets and Kerguelen's Land, well within the course of the Antarctic drift, which, fusing with the Cape-Horn current, sweeps in an easterly direction across the Antarctic sea and further within the broad belt of prevalent westerly winds. The combined action of the winds and the current have, no doubt, brought about in greater part the diffusion of the Fuegian and Falkland-Island plants to the islands lying eastward of them; but it is possible that the multitude of sea-birds inhabiting the islands, and nesting, as they do, amongst the herbage, may have been of influence in the matter by transporting seeds attached to their feathers or feet. Most of the birds are of widely wandering habits.

The island of Marion, the larger of the two forming the group, and on which alone of the two an opportunity of landing was afforded, is about 11 miles in length, 8 in extreme breadth, and about 80 square miles in area. The highest point is about 4250 feet above the sea-level. The island is entirely volcanic, and presents the usual features of volcanic islands which are of considerable age. The highest land is in the centre; and irregular slopes lead down to the sea on all sides. These slopes are of very moderate inclination, and are broken in numerous places by shallow valleys bounded by cliffs where the more ancient flows of lava have suffered denudation. These valleys are occupied by more recent lava-flows, which still retain their rough pinnacled upper surface. Further, all over the slopes and summits of the island are scattered irregularly numerous small cones, formed mostly of conspicuously red scoriæ. The lava is basaltic, presenting in many places in the cliffs a columnar structure. Some sand gathered on the shores of a small freshwater lake near the sea was full of augite and olivine crystals.

The island was sighted together with Prince-Edward Island on Dec. 25, but was not approached closely till the morning of Dec. 26th. The upper part of the island was covered with snow, commencing, as usual, on the slopes as patches lying unmelted in sheltered hollows, succeeded by a general thin coating or powdering over, through which the black rock showed out in all directions, and above this, again, on the highest cones and peaks, forming a continuous sheet of glistening white. The summits were enveloped in clouds, which lifted or dispersed in a partial manner from time to time. Below the snow and up amongst the patchy region, the slopes of the island were covered with a coating of green, which formed a contrast to the dark cliffs and red lower ones, which were almost destitute of verdure and had very little snow upon them. Here and there large patches of yellow showed out amidst the green, and were conspicuous even at some distance from the shore. It was found that these patches were formed of mosses. The mosses, indeed, occurring thus in patches, some dark, some nearly white, and others yellow, form the principal features in the vegetation as seen from a distance, showing out, as they do, amongst the very uniform mixture of phanerogamic plants. The small rocky projections on the rough surfaces of the modern lava-flows, standing out dark above the verdure, have at a distance exactly the appearance of low bushes with dark foliage, and were at first belived to be such. Landing was effected on the N.E. side on Dec. 26, 1873. The day was remarkably fine and sunshiny.

The rocks, about half-tide mark, are covered with a dense growth of *Durvillea utilis*, which is of great assistance in breaking the surf. Beyond the ordinary reach of the sea, but still within the beach-line, the rocks are covered with a crassulaceous plant

(*Tillæa moschata*, DC.), occurring also in Kerguelen's Land. Succeeding the beach is a thick growth of herbage investing a swampy black peaty soil, which covers the underlying rock more or less thickly everywhere on the lower ground and extends up with the herbage almost to the snow. The principal plants forming the thick growth are an *Acæna* (*Acæna ascendens*), *Azorella selago*, and a grass (*Festuca Cookii*, Hk. f.). The *Acæna* is by far the most abundant plant on the island. The *Azorella* forms low, convex, bright green patches in intervals between the *Acæna* or cake-like masses at its roots. The grass is abundant everywhere, mingled with the *Acæna* and *Azorella*. The plants are, no doubt, rendered especially luxuriant by the dung of the numerous sea-birds; but no mutual benefit or arrangement has sprung up between the *Festuca* and the Penguins, as it has at the Tristan d'Acunha group between the Penguins and *Spartina arundinacea*. The *Festuca* nowhere forms a tussock. The rookeries of King Penguins are entirely bare, and the grass is not more luxuriant around the nests of the Golden-crested Penguins than elsewhere. The *Festuca* was the only grass found in flower in the island. Different-looking forms were observed, especially around the numerous pools of water on the hill slopes; but they are possibly mere modifications of the same grass due to alteration of condition; none of them were in flower. *Ranunculus biternatus*, Sm., grows abundantly, especially near the sea, in damp places, creeping at the roots of the larger plants; and *Callitriche antarctica*, Engel., and *Montia fontana*, L., grow in similar situations, associated as at Kerguelen's Land (Fl. Antarct.). *Stellaria media*, L., is abundant. *Pringlea antiscorbutica*, Hk. f., is, at least in the part of the island explored, by no means so abundant as at Kerguelen's Land. It was some time before a plant was found; but subsequently a good many were met with, but not growing in groups of more than four or five plants. Some were found on the very verge of the shore, within reach of the spray, and the rest on the banks of a small rivulet. The cabbage was mostly in full flower and bud, with sepals and anthers complete. No plants were found with seed at all ripe. The last year's seeds were decayed. This plant at least would appear to have a regular summer flowering-season, since Dr. Hooker found only the fruit at Kerguelen's land in the winter. Both the *Acæna* and the *Ranunculus* are common, growing in the water-pools almost as water-plants, with long tendril-like root-fibres. The *Ranunculus* becomes more and more dwarfed as it grows further and further from water. The two Lycopods (*Lycopodium Saururus*, Lam., and *L. clavatum*, var. *magellanicum*, Sw.) were abundant, the larger species affecting drier situations than the smaller. Of the ferns the *Lomaria alpina* is the most conspicuous, forming thick and wide patches amongst the *Acæna* and grass, and occurring abundantly everywhere. *Aspidium mohriodes*, Bory, was found growing under sheltered banks beside the small stream together with the other three ferns. Of the *Asplenium*-like fern only one patch was found, in a dark cavity under a fallen rock. The *Aspidium* is not abnndant. *Hymenophyllum tunbridgense* and *Polypodium australe* grow abundantly on the sheltered sides of the projecting rock-masses already mentioned, but are dwarfed and almost hidden amongst the mosses. They grow in greatest luxuriance on the damp banks of the stream.

The mosses are in most striking abundance, and, in some very wet places, form continuous sheets over the ground many square yards in extent. Lichens are not in very great quantity, except the incrusting forms, which are tolerably abundant on the rocks. There was not sufficient time available to allow of these being collected carefully. One Agaric was found growing on *Azorella* apparently *A. glebarum*, described by Mr. Berkeley as growing on *Bolax* in the Falklands (Fl. Antarct.).

An attempt was made to reach the actual upper limit of vegetation, but failed from being commenced too late in the day. The ascent was up the bed of the small stream already mentioned, which lay at the verge of one of the modern lava-flows, where it abutted on a low cliff exposing a more ancient flow in section. The more recent flow had a very gradual inclination of not more than 8°. The first scattered patches of snow were encountered at about an elevation of 800 feet. A patch of *Pringlea* was met with at 1000 feet. The highest point reached was at about 1500 feet elevation. Here the *Ranunculus* had disappeared, and where growing a little lower down was very much dwarfed. The *Azorella*, with a few mosses, formed the principal vegetation; but the green was merely dotted over the bare rock and stones.

The patches of snow were here frequent. The *Azorella* appeared from this point to be continued on for about 300 feet more, becoming scantier and scantier. The absolute limit of vegetation may probably be placed at about 2000 feet. The part explored was somewhat sheltered. A red cone of scoriæ more exposed was quite bare of green from about 1000 feet elevation upwards.

At about 1400 feet elevation the water in a shallow pool exposed to the sun was found to have a temperature of 65° F., the temperature of the air in the shade being 44°. At 900 feet a similar pool, but one which had a small stream of colder water running into it from the cliff, had a temperature of 55°, the air here being at 45°. The thermometer here, when plunged into the midst of a rounded mass of *Azorella*, rose to 50°. It is evident that these mounds retain and store up a considerable quantity of the sun's heat; and this fact probably yields an explanation of their peculiar form, which is that of so many otherwise widely different Antarctic plants.

The island being of such considerable area, and so short a time having been available for the examination of its flora, no conclusions can be drawn from the absence of certain plants, such as *Lyallia*, which might have been expected to occur there, since they occur in Kerguelen's Land associated with nearly all those found. Although the few plants on such islands as these are, as a rule, widely spread, yet some appear to be local and somewhat scarce, as, for example, the *Aspidium* and *Asplenium*, which were only found at the last moment, the latter almost by accident. It is thus highly probable that several plants have been overlooked, and amongst them probably *Lyallia*. The nine flowering plants collected are probably all identical with the species growing in Kerguelen's Land; and the same is the case with the club-mosses. The ferns form the most remarkable feature in the flora, since there are here five species, whilst only one occurs in Kerguelen's Land*. The occurrence of *Pringlea* on the island, as also on the Crozets and Kerguelen's Land, points to an ancient land-connexion between these islands, which the antiquity and extent of denudation of the lavas would seem to bear out. It is difficult to see how such seeds as those of *Pringlea* could have been transported from one island to another by birds; and the seeds seem to be remarkably perishable; besides, the distinctness of the genus points to a former wide extent of land on which its progenitors became developed. The existence of fossil tree-trunks in the Crozets and Kerguelen's Land points to similar conditions.

Sixteen vascular plants were found in the island of Marion; Kerguelen's Land has nineteen—but amongst these only one fern as against five in Marion Island, and sixteen flowering plants as against nine in Marion.

---

* Since these notes were written, in 1873, other forms have been found in Kerguelen's Land by the "Transit-of-Venus" Expeditions.

The species of Phanerogamia and vascular cryptogams found in Kerguelen's, Marion, and Yong islands are enumerated in Prof. Oliver's report upon my collection (Journ. Linn. Soc. xiv. 389), from which report the specific names above cited are taken. For the Cryptogamia of Marion Island, *vide* Prof. Dickie on the Algæ, *op. cit.* vol. xv. p. 42; the Rev. M. J. Berkeley on the Fungi, *l. c.* p. 52; Mr. W. Mitten on the *Musci* and *Hepaticæ*, *l. c.* p. 70; and the Rev. E. O'Meara on the Diatoms, *l. c.* p. 55.

The following are the temperature-observations taken on board the 'Challenger.'

On December 26, when the ship was off Marion Island, the thermometer, read at 6 in the evening, showed for the preceding twelve hours, maximum 45°·5 F., minimum 36°·2.

December 27. The ship was occupied dredging off both islands; 6 A.M. maximum 43° F., minimum 40°·5; sea-surface 40° to 41°.

On December 26 the temperature at 10 A.M. was 37°·8 F.; midday, 43°; midnight, 42°.

XXXVII. Supplemental Notes on Algæ collected by H. N. Moseley, M.A., of H.M.S. 'Challenger,' from various localities. By Prof. Dickie, M.D., F.L.S.

[Read November 2, 1876.]

(1) *Algæ obtained at Papeetee Harbour, off Tahiti*, in 20 fathoms.

Lithothamnion imbricatum, n. sp.

Fronde adnata, supra repetitim imbricata; lamellis crassis; ramis subhorizontalibus, compressis, lobatis, apicibus obtusis. Keramidiis minutis, hemisphæricis, dense aggregatis.

The specimens are 3 to 4 inches in diameter, much imbricated, lobed, and branched. In the dry state the colour is pale green.

(2) *On stones at the margin of Hakone Lake, Nipon, Japan.*

Draparnaldia pulchella, *Ktz.*

Nostoc paludosum, *Ktz.*

The specimens were preserved in fluid; and, although not good, I can see no essential difference between them and European species.

(3) *On shore-rocks at Valparaiso the following species were found.*

LAMINARIACEÆ.

MACROCYSTIS PYRIFERA, *Ag.*

M. LATIFOLIA, *Bory.*

M. ANGUSTIFOLIA, *Bory.*

LESSONIA NIGRESCENS, *Bory.*

CORALLINACEÆ.

CORALLINA BERTERII, *Mont.*

RHODYMENIACEÆ.

PLOCAMIUM CORNUTUM, *Turner.*

CRYPTONEMIACEÆ.

IRIDÆA LAMINARIOIDES, *Bory.*

GRATELOUPIA VERSICOLOR, *J. Ag.*

CERAMIACEÆ.

CENTROCERAS CRYPTACANTHUM, *Ktz.*

ULVACEÆ.

PORPHYRA LACINIATA, *Ag.*

ENTEROMORPHA COMPRESSA, *Grev.*

ULVA LATISSIMA, *L.*

CONFERVACEÆ.

CHÆTOMORPHA LINUM, *Roth.*

C. AEREA, *Dillw.*

(4) *Algæ from Port Louis, Falkland Islands, and Magellan Straits.*

CERAMIACEÆ.

CERAMIUM INVOLUTUM, *Ktz.*

This is probably a form of the variable *C. rubrum*, which is recorded in 'Flora Antarctica.'

GRIFFITHSIA ANTARCTICA, *H.f. & Harv.*

Both these were dredged in 4 to 5 fathoms.

MELOBESIA CALCAREA, *Ell. & Sol.*

It formed dense beds in Isthmus Harbour, Straits of Magellan, and was dredged in 8 fathoms.

(5) *Specimens got at low tide, St. Vincent, Cape-Verd Islands.*

CHORDARIACEÆ.

RALFSIA EXPANSA, *J. Ag.*
Geog. distr. Gulf of Mexico and Indian Ocean.

RHODOMELACEÆ.

POLYSIPHONIA GORGONIÆ, *Harv.*?

The few specimens are barren and rather imperfect; they are therefore referred with some doubt to the species described by the late Professor Harvey, from Key West, Florida.

LAURENCIACEÆ.

LAURENCIA PAPILLOSA, *Forsk.*, var. THYRSOIDES.

L. OBTUSA, *Hudson.*

A small and slender form.

WRANGELIACEÆ.

WRANGELIA PLEBEIA, *J. Ag.*
Previously found at Vera Cruz, Gulf of Mexico.

CORALLINACEÆ.

LITHOTHAMNION MAMILLARE, *Harv.*
Geog. distr. Bahia; Terra del Fuego; Algoa Bay.

JANIA TENELLA, *Ktz.*
Geog. distr. Gulf of Naples; Gulf of Mexico.

GELIDIACEÆ.

HYPNEA CERVICORNIS, *J. Ag.*
Geog. distr. Shores of Brazil; Indian Ocean; Gulf of Mexico.
A very dwarf form.

(6) *Algæ collected in shallow water at Bermuda.*

SARGASSUM AFFINE, *J. Ag.*

AMPHIROA FRAGILISSIMA, *L.*

HALIMEDA INCRASSATA, *Lamx.*, var. MONILIS.

H. TUNA, *Lamx.*

UDOTEA FLABELLATA, *Lamx.*

CODIUM DIFFORME, *Ktz.*

BRYOPSIS PLUMOSA, *Ag.*

CHLORODESMIS VAUCHERIÆFORMIS, *Bailey.*

Penicillus capitatus, *Lamk.*

Anadyomene flabellata, *Lamx.*

Ulva latissima, *L.*

Lyngbya majuscula, *Harv.*

(7) *Specimens from Torres Straits.*

Mastophora Lamourouxii, *Dne.*
At Booby Island.

Acetabularia calyculus, *Quoy & Gaim.*
In 8 fathoms, off Hammond Island.

(8) *From several localities in the Philippines.*

Lithothamnion byssoides, *Lamk.*

The only specimen seems to be a form of the Mediterranean species, the apices rather more obtuse.

Found at Zamboanga.

Acetabularia calyculus, *Quoy & Gaim.*
Reefs at low water, opposite Harbour of Cebu.

Lyngbya ferruginea, *Ag.*
Surface of sea and mangrove-swamp, Zamboanga.

Oscillaria gracillima, *Ktz.* ?

The specimens are allied to the above, if not identical.
Camiguin Island, in water at temperature of 46°·5 C.

Spirogyra —— ?

The filaments are in breadth ·0001 inch, the joints four to five times as long as broad. No conjugation, and no spores.

In a stream, not thermal, same island as the last.

(9) *Doubtful examples from the Admiralty Islands.*

Spirogyra —— ?

Probably allied to *S. dubia*, Ktz., the specimens are not in conjugation, and without spores.

Found in a forest-swamp on the main island.

(10) *Algæ obtained at Tongatabu.*

Lithothamnion mamillare, *Harv.*

The specimens are partly covered with a sponge, viz. *Halichondria panicea*, Grant.

Found upon the reefs.

On the Distribution of the Monocotyledonous Orders into Primary Groups, more especially in reference to the Australian Flora, with notes on some points of Terminology. By George Bentham, F.R.S.

[Read Nov. 2, 1876.]

(Plates VII.–IX.)

The Monocotyledonous Orders appear to be generally connected with each other by a combination of characters at least as complicated as is usually the case with Dicotyledons; and their distribution into subclasses or alliances distinguished by positive characters has not been very successful—although very different methods have been proposed, according to the paramount importance attached by the authors to one or another character.

Lindley, in his 'Vegetable Kingdom,' proposed the separation as a distinct class, under the name of Dictyogens, of a few genera remarkable for the reticulate venation of their leaves. But this has been generally rejected, as dividing groups otherwise nearly related, besides that the venation has been found to be exceptionally reticulate in a few genera belonging to very various orders in which it is generally parallel; and in a large number of Monocotyledons the primary parallel nerves or veins are really more or less connected by fine, rarely conspicuous transverse veinlets.

Elias Fries, in 1835, relied in the first instance on the perianth as presenting the best primary characters, establishing four primary divisions, partly corresponding to those I should be inclined to adopt, but with some important exceptions, such as placing the Cyperaceæ in the Spadicifloræ and mistaking the glumes of Gramineæ for perianths.

Adolphe Brongniart, in 1843, published a very able attempt at a rearrangement of both Dicotyledons and Monocotyledons with a view to obviate some of the chief objections made to the Candollean series. In this arrangement he adopted as a primary character, in Monocotyledons as in perigynous Dicotyledons, the nature of the albumen, whether farinaceous, non-farinaceous, or deficient. Important as these distinctions are, they cannot be taken as absolute; for several genera of Aroideæ, for instance, have the exalbuminous embryo of Naiadeæ; Hemodoraceæ and

Vellozieæ become very unnaturally separated from Amaryllideæ and Hypoxideæ, to associate them with Pontederaceæ, &c.

Some other partial rearrangements of Monocotyledons, according to the relative importance attached by different botanists to the several chief characters, have been proposed, but none of them followed out sufficiently to require special mention.

In classing these orders for the 'Flora Australiensis' I have endeavoured, as far as possible, to conciliate practical convenience with supposed natural affinity; and after trying in detail various combinations, the following main groups, corresponding in many respects to those of Fries, have appeared to me the most appropriate—although, in consequence of the necessity of placing them in a lineal series (which is not in nature) some orders become still separated from near connexions, and the characters given can very rarely be regarded as absolute without exception.

Alliance (Cohors) 1. EPIGYNÆ. Ovary inferior. Perianth usually 2-seriate.

* Aquatic plants with regular flowers and exalbuminous seeds: *Hydrocharideæ.*

** Terrestrial plants with irregular flowers and exalbuminous seeds: *Scitamineæ* (including *Musaceæ* and *Canneæ*).

*** Terrestrial plants with irregular or regular flowers and minute exalbuminous seeds, the embryo apparently homogeneous: *Orchideæ* (including *Apostasieæ*) and *Burmanniaceæ.*

**** Terrestrial plants with regular or oblique flowers and albuminous seeds: *Irideæ, Amaryllideæ* (including *Hæmodoreæ, Vellozieæ, Hypoxideæ,* &c.), *Taccaceæ,* and *Dioscorideæ*; also the American order *Bromeliaceæ.*

Alliance 2. CORONARIÆ. Ovary superior, usually syncarpous. Perianth usually 2-seriate. Seeds albuminous.

* Perianth of both series petaloid: *Roxburghiaceæ, Liliaceæ* (including *Smilaceæ, Asparageæ, Agaveæ, Melanthaceæ,* and several proposed small orders), *Pontederaceæ.*

** Outer perianth calycine or none, inner petaloid: *Philydraceæ, Xyrideæ, Commelynaceæ.*

*** Perianth of both series calycine: *Junceæ* (including *Xerotideæ*), *Palmæ.*

Alliance 3. **NUDIFLORÆ.** Ovary free, apocarpous monocarpellary or rarely syncarpous. Perianth none, or reduced to a small scale under each anther (except *Alismaceæ*). Seeds with or without albumen.

* Anthers opening outwards or in terminal pores; perianth none, or scale-like: *Pandaneæ, Aroideæ* (including *Orontiaceæ*), *Typhaceæ, Lemnaceæ, Naiadeæ* (including *Zosteraceæ* and most *Juncagineæ*).

** Anthers opening inwards; perianth more or less petaloid: *Alismaceæ* (including *Butomeæ* and *Aponogeton*).

Alliance 4. **GLUMALES.** Ovary free, 1-ovulate or with 1-ovulate cells. Flowers usually in heads or spikelets within imbricate bracts or glumes. Perianth either none or scarious or glume-like, and usually concealed within the bracts. Seeds albuminous.

* Ovary often with more than one cell; ovule pendulous: *Eriocauleæ, Centrolepideæ, Restiaceæ.*

** Ovary always 1-celled; ovule erect: *Cyperaceæ, Gramineæ.*

There are, besides, a few small American more or less anomalous genera which have been proposed as distinct orders, but which will, I believe, all be referable to some of the above orders of Coronariæ or Nudifloræ.

The first of these alliances, the Epigynæ, has been more or less accepted by the majority of botanists as founded on a principle established by Jussieu and never satisfactorily superseded. It has been objected to by others as separating Hydrocharideæ from Alismaceæ, and Amaryllideæ from Liliaceæ; and the main character is ambiguous or fails entirely in some Bromeliaceæ; yet it is convenient and more definitely marked out in nature than any other that has been hitherto proposed.

The most striking objection to this arrangement is the position of the Hydrocharideæ, so far removed from the Alismaceæ, to which they bear a considerable resemblance in their aquatic habit, their embryo, and, to a certain degree, in the perianth and stamens, and with which they have even been united, as a tribe only, by Ascherson and others. The habit, however, is a resemblance only, which they have in common with genera belonging to widely distant orders, such as Halorageæ, for instance, among Dicotyledons, and which, being in a great measure adaptive, affords no indication of affinity. The want of albumen is important; but neither here nor any where else can it be taken as an absolute character; and, besides the technical difference in the inferior ovary, the numerous seeds or parietal placentas of several genera of Hydrocharideæ are very different from any thing observed in the essentially apocarpous Alismaceæ and Naiadeæ.

The Scitamineæ (including Musaceæ and Canneæ) are placed next, not with the intention of implying any affinity to Hydrocharideæ, which stand, as it were, alone, but because they could not be conveniently placed between any two of the following orders without breaking through more natural series, which they do not here; for although Hydrocharideæ and Orchideæ are artificially connected by their exalbuminous seeds, there is no natural bond of union beyond the general one common to all Monocotyledons. Scitamineæ are, on the other hand, notwithstanding their very different seeds, in some measure connected with Orchideæ by the peculiar irregularity of their flowers, all but one of the stamens, or at least one out of the six, being suppressed or replaced by petal-like or variously shaped staminodia.

Orchideæ form one of the very few Monocotyledonous orders that are absolutely defined, surrounded on all sides by a gap which is nowhere bridged over. It is here placed as approaching, in some measure, on the one hand the Scitamineæ by the abovementioned irregularity in their flowers, and on the other the Burmanniaceæ by their minute exalbuminous seeds with an apparently homogeneous embryo.

Burmanniaceæ constitute a small order, also very fairly limited, connected, on the one hand, with Orchideæ through the ovary and seeds, and, on the other, with Irideæ by their centrifugal inflorescence, the equitant leaves of several genera, &c., but without any intermediate genus on either side. Some affinity has also been suggested with Triurideæ, founded, however, merely on adaptive resemblances of some genera of less importance than those which, as above mentioned, seem to connect Hydrocharideæ with Alismaceæ.

With Irideæ we commence a long series of orders extending to the Cyperaceæ inclusive, nowhere separated by definite boundary lines which are not occasionally crossed over from the one side or the other. In the lineal series we are obliged, it is true, sometimes to make sudden breaks; but that is merely owing to the impossibility of representing complicated cross connexions in one continuous line. Having followed out one branch of affinities to its apparent end, we have suddenly to go back to take up another branch which we had been compelled to leave behind.

Irideæ are for the most part distinguished from the other Epigynous albuminous orders by the equitant leaves, regular or oblique triandrous flowers with the anther-cells turned outwards, and frequently by the centrifugal inflorescence. But none of these characters are constant. Equitant leaves occur in various orders, and are not in *Crocus*, for instance. The inflorescence cannot be determined when reduced to a single flower, and in some genera is certainly centripetal. *Diplarrhena* has the irregular suppression or imperfection of one stamen, as in some Scitamineæ. *Campynema*, which, for reasons given in 'Flora Australiensis,' I have transferred from Amaryllideæ to Irideæ, has six stamens; and *Hewardia*, which, from its superior ovary, is placed in Liliaceæ, has the habit and all the other characters of Irideæ.

I have in the 'Flora Australiensis' given my reasons for adopting the wide extent given by some botanists to Amaryllideæ so as to include Hæmodoraceæ, Hypoxideæ, Vellozieæ, and (with somewhat less certainty) Alstrœmerieæ. Their anther-cells turned inwards or lateral, a character apparently more constant here than in the hypogynous or perigynous orders, is perhaps the only certain character to separate this large order from Irideæ; whilst the closely allied Liliaceæ are removed only by the technical character of the superior ovary.

The small order Taccaceæ, closely allied to the Amaryllideæ, is distinguished by the parietal placentation with numerous ovules, and Dioscorideæ by the unisexual flowers and peculiar habit connecting them with some of the climbing genera of Liliaceæ, and especially with Roxburghiaceæ—a specimen of a *Roxburghia* without flowers having even been mistaken by Brown for a *Dioscorea*. Bromeliaceæ, including genera with the ovary partially, and perhaps wholly, superior, connecting the Epigynæ with the Coronariæ, are exclusively American; and I have as yet examined in detail only a few of the genera.

Coronariæ is a name originally given by Linnæus to a small group of Liliaceæ, but is here taken in the extended sense given to it by Endlicher, with the still further addition of that author's *Principes* and of two orders taken from his *Enantioblastæ*. It conveniently expresses one of the chief characters of the alliance, a normally biseriate perianth, of which the inner or both series are spreading or prominent above the subtending bract. This character is, I believe, constant in the alliance, though it is also found in the Alismaceæ classed, for other reasons, with the Nudifloræ and in two small genera of Restiaceæ. The superior ovary distinguishing the Coronariæ from the Epigynæ is also constant within the alliance, although variable on its borders in the above-mentioned Bromeliaceæ; the ovary is almost, but not quite, constantly syncarpous; and I know of no exception to the albuminous seeds, although that character is so variable in Nudifloræ.

Endlicher's class Enantioblastæ was an artificial and somewhat unnatural union of Commelyneæ and Xyrideæ with Restiaceæ and their allies—as previously proposed by Martius, on account of the position of the minute or lenticular embryo at the opposite extremity of the albumen to that of the hilum in a slight cavity rather than deeply immersed in the albumen. In some other instances also it has been endeavoured to distinguish various Liliaceous groups by the position of the embryo with relation to the hilum, but this character proves too variable for practical use. In the great majority of Monocotyledons with solitary or few ovules the embryo or its radicular extremity is basal with respect to the fruit, and is consequently more or less distant from the hilum, according as the ovule had been erect and anatropous, laterally attached and amphitropous, or pendulous and orthotropous. In Commelyneæ, however, it is lateral on the side opposed to the lateral hilum; in *Xanthorhea* it is transverse, whilst the hilum is basal; in several Liliaceæ it is variously oblique, in some Alismaceæ horseshoe-shaped with both ends directed downwards; but in no Monocotyledon, as far as I am aware, is the radicular end or the small embryo superior with relation to the fruit; and it does not, therefore, afford that positive character which we observe in some Dicotyledons.

The characters separating the three subdivisions of Coronariæ founded on the texture of the perianth must be taken as general only, not absolute; for in several of the smaller-flowered genera the petaloid or calycine nature of the perianth is very ambiguous, and the place of such genera has to be determined by general affinity evinced by a combination of other characters.

The very small order Roxburghiaceæ, differing from some Liliaceæ chiefly in their 4-merous, not 6-merous, flowers, and in some measure in the venation of the leaves, is placed first as showing in habit some approach to Dioscorideæ, the last order of Epigynæ.

With regard to Liliaceæ, I have, after much consideration, felt the necessity of adopting the extended view given to that order by J. G. Baker in the series of papers published in our Journal. There are, it is true, a number of characters which at first sight might appear of sufficient importance to separate ordinally a number of large or small groups, or even single species, such as habit, venation of leaves, inflorescence, anther-cells turned outwards or inwards, styles distinct or united, ovary completely or imperfectly divided into cells, fruit baccate capsular or nucamentaceous, colour and consistency of the seed-testa, albumen hard, fleshy, or more or less farinaceous, distance of the embryo from the hilum, &c. But upon further investigation these characters prove to be either exceptionally isolated, separating groups in other respects evidently nearly related, or if two or more exceptional characters may be observable in one genus or in a group of several genera, they are either so variously combined or so gradually evanescent in intermediate genera as hitherto to render unavailing endeavours to define satisfactorily subordinate groups. I have no distribution into tribes to propose as an improvement upon those adopted by Baker; but at the same time it must be admitted that some of them are purely artificial. Several of the baccate genera are more naturally allied to corresponding capsular ones than to each other; and the baccate character itself is often very uncertain, as, for instance, in *Cordyline*. The outward direction of the anther-cells, so useful in the definition of Irideæ as well as of all the Nudifloræ except Alismaceæ, fails entirely for the separation of Melanthaceæ—the genera usually included in that tribe or suborder showing every degree between the outward, the lateral, and the inward direction.

It is true that, as already remarked, the limitation of the whole order may in the same way be sometimes stigmatized as uncertain or artificial. *Hewardia*, for instance, is in many respects nearer to Irideæ than to Liliaceæ; *Blandfordia* resembles some Amaryllideæ rather than any other Australian Liliaceæ; the main character separating Liliaceæ from Junceæ scarcely holds good, if we compare the small-flowered Asparageæ with the Xerotideæ; but these cases are comparatively few, and wherever the boundary line is drawn, it must be more or less arbitrary or artificial.

Pontederaceæ differ but little from Liliaceæ, chiefly in their aquatic habit and a slight irregularity in the flowers; they are, however, chiefly American, and require further study.

The second subdivision of Coronariæ, those with the inner perianth petal-like as in the first, but the outer one calyx-like or deficient, is a somewhat artificial one, and includes three very distinct orders, which have been very variously placed by different botanists.

Philydraceæ, limited to four Australian or East-Asiatic species distributed in three genera, cannot nevertheless be brought into, or even very near, any other order. The general structure of the ovary and some other points induced me in the 'Flora Hongkongensis,' to refer them to Xyrideæ; but the anatropous ovules and basal embryo are rather those of Liliaceæ, whilst the peculiar irregularity of the flowers with only one perfect stamen and two staminodia is that of Scitamineæ; and the perianth is quite abnormal, consisting of two rather large petals only; the upper two-nerved one, however, is apparently formed by the combination of two; and the perianth must be probably regarded as limited to the inner series, the outer series being entirely deficient.

Xyrideæ, on account of their glumaceous inflorescence and orthotropous ovules, have been, by Martius and others, associated with Restiaceæ and some others in a separate alliance. *Xyris*, however, differs essentially from the latter order, as well in the great petaloid development of the inner perianth, as in the structure of the ovary. The imbricate glume-like bracts each embracing a single sessile flower occur also in *Johnsonia* and its allies among true Liliaceæ; and the structure of the seed, although usually one of the most important characters, may, like all others, become purely artificial if unaccompanied by other differences.

I would here observe that there is one point in which the homology of the parts of the flower in *Xyris* appears to me to have been in some measure mistaken. The two outer scales (Plate VII. figs. 1–3), usually regarded as two outer perianth-segments, are placed opposite to each other at the very base of the floral axis; they are concave or complicate, and keeled, and persist after the true perianth has fallen away or shrivelled up; they have therefore all the characters of the bracteoles observable in many genera of the epigynous as well as of the coronal orders. The next, or so-called third perianth-segment of the outer series is placed higher up on the floral axis, immediately under the inner series with an annular attachment perfectly closed round the axis when in bud; it is of a very different texture from the bracteoles, completely encloses the inner segments in the young bud, disarticulates at the base, and is cast off as those inner segments grow out. This so-called third segment would therefore appear rather to represent the whole outer series, and to consist of the union of its three normal segments, as may be seen in some species of *Eriocaulon* and a few other genera.

Commelynaceæ have likewise been associated with Restiaceæ, but with still less reason than Xyrideæ, and solely on account of their anatropous ovules and, in some respects, the structure of the seeds. The inflorescence is never glumaceous; and the ovules, even when solitary, are not pendulous. The order, though technically associated with Xyrideæ and Philydraceæ, having usually a very delicate petal-like inner perianth or corolla, whilst the outer one is strictly calycine, is a very distinct one, and shows no immediate affinity to any other; nor are there any connecting genera, unless perhaps *Cartonema* may indicate some approach either to Liliaceæ (Chlorophyteæ) or to Junceæ (Xerotideæ).

In a third subdivision of Coronariæ, those with the whole perianth calycine, might be placed two large orders, not usually found in juxtaposition, but which appear to me to be more conveniently associated under Coronariæ than in any other series.

Juncaceæ are, without doubt, so closely connected with Liliaceæ, that some genera have been placed by some botanists in the former, by others in the latter, according to which of the several characters which usually separate them has been taken as absolute. Of these characters, the most constant is the above-mentioned one derived from the nature of the perianth, corolline or petal-like in the Liliaceæ, calycine in the Juncaceæ. In *Xerotes*, however, for instance, the perianth is sometimes very little different from that of some Asparageæ, although in all other respects it is rightly associated with the Juncaceæ rather than with Liliaceæ. The prevalent habit of Juncaceæ, approaching that of the Glumales, is very rare in Liliaceæ; but in *Xerotes* and *Xanthorrhœa* it is often arborescent, as in *Dracæna* and its allies. Again, the black crustaceous testa and fleshy or hard albumen in the seeds of Liliaceæ have been given as absolute characters separating that order from Juncaceæ, where the albumen is usually farinaceous, and the testa membranous or pale-coloured; but in *Blandfordia*, for instance, the testa is pale and soft; in some of the baccate genera of Liliaceæ the hard albumen becomes sometimes almost mealy; and in *Xanthorrhœa*, most unnaturally dissociated from *Kingia* and *Dasypogon*, the testa is black and the albumen hard or fleshy, as in true Liliaceæ. The embryo is in most Juncaceæ (except *Xanthorrhœa*) small and erect from the base of the seed, whilst in Liliaceæ it is very variously placed with relation to the hilum, rarely absolutely basal. The line separating the two orders may therefore well be the subject of difference of opinion; and a certain number of genera, chiefly Australian, and each one very distinct in itself (*Xerotes*, *Kingia*, *Dasypogon*, and *Calectasia*, with or without *Xanthorrhæa*) have often been grouped together into an intermediate order under the name Xerotideæ, although to me they appear to be much more appropriately regarded as a tribe of Juncaceæ.

The very distinct almost monotypic genus *Flagellaria* has, on account of its farinaceous albumen, been placed by some under Juncaceæ, with which it has little else in common; by others it has still more inaptly been referred to Commelynaceæ because of the embryo almost superficial and remote from the hilum. It would appear, however, that it might well be included in Liliaceæ (Smilaceæ) in the vicinity of *Rhipogonum*.

Palms form a group so natural and so striking that they are universally acknowledged as a substantive order, which some would raise to the rank of an alliance, or even of a separate class; and yet the distinctive character rests chiefly on the organs of vegetation, a woody stem combined with pinnately or palmately divided or lobed leaves, the structure of the flower and fruit in most genera being very nearly that of the Coronariæ, especially of Juncaceæ. The size and hardness of the albumen is exceptional in many, but not in all, the genera. The apocarpous or monocarpellary ovary in few instances has induced an approximation to Pandaneæ, which exhibit a somewhat similar arborescent habit; but that habit occurs also in *Dracæna*, *Xanthorrhœa*, and other Coronariæ, always, however, with undivided leaves.

The spatha enveloping the young inflorescence is usually given as an essentially distinctive character of Palms as well as of Aroideæ, and is really a well-marked and generally prevalent feature, but not quite constant, and in other orders a very uncertain one. The passage from the stem-leaves to the next following bracts is in some Monocotyledons as gradual as in any Dicotyledons; but in the great majority the stem-leaves with their short sheaths and long laminæ, whether radical, or scattered along or terminating the stem or branches, cease abruptly under the peduncle, scape or flowering branch; this bears only bracts or scales, being usually more or less developed sheaths either close or open, but without any or with only very small distinct laminæ. Of these bracts or scales there are sometimes none below the one subtending the inflorescence or pedicel; but frequently also there are two or more closely imbricate at the base of the peduncle or scape, or one, two, or more smaller ones scattered along it. These are usually termed sheaths, sheathing scales, or simply scales, according to the degree in which they embrace or envelope the stem. In the inflorescence there is usually, but not always, one subtending each branch or pedicel, and specially termed bract in contradistinction to the scales of the peduncle or scape. In some cases (as in most Aroideæ and Palms) the lowest bract is much larger than the others, enclosing the whole inflorescence when young; and then it receives the special name of spatha. Often, however, it is but little more developed or even smaller than those next above it; and it is then termed a bract or a spatha according to its degree of development in the majority of allied genera. In *Pandanus*, in *Gymnostachys*, in *Typha*, &c., where two or more bracts under some of the upper branches are as much developed as the lowest, they are either all or none, or the lowest only, designated as spathas with almost equal fairness. Where the spatha is well developed, especially in Aroideæ and often in Palms, the enclosed inflorescence is usually termed a spadix; but there is really no more definite distinction between a spadix and a panicle or spike than there is between a spatha and a bract. The spatha, however, enclosing the young spadix is very general in Palms and in Aroideæ; and as, being called upon to exercise a more important function than ordinary bracts, it is also fairly constant in its modifications, it becomes an important though not an absolute character, and there is great convenience in adopting the special terminology in use. But in several other orders, where the passage from the ordinary bract to the specially enlarged one is gradual or uncertain, the vague use of the term spatha in technical characters often tends to mislead rather than to give clearness to a definition.

The Nudifloræ proper include a group of five orders universally acknowledged to be closely allied to each other, although very variable in the structure of their seed. All are without perianth or with only a small scale under each stamen. Bracts are rare except a spatha at the base of the inflorescence, and sometimes under its principal branches. The anthers are usually sessile, or on short thick filaments with the cells opening outwards, or in terminal pores. The ovary is, with few exceptions, apocarpous or monocarpellary. The seeds are albuminous with a small or axile embryo in two orders (Pandaneæ and Typhaceæ); exalbuminous in one (Naiadeæ); albuminous in some genera, exalbuminous in others in the remaining two (Aroideæ and Lemnaceæ). The distinctive characters of these several orders have been too well marked out in various works to require any comment on the present occasion, except that I cannot agree with Kunth in considering each stamen and each carpel, in *Potomogeton* and its allies, as a separate unisexual flower, and that I would include in Naiadeæ both *Triglochin* and *Scheuchzeria*.

Alismaceæ form a small order very puzzling as to its affinities. The objections to associating it with Hydrocharideæ, as frequently proposed, have been above adverted to. The double perianth of the majority of genera (reduced to two petaloid segments in *Aponogeton*) might refer it to Coronariæ, were it not for the apocarpous ovary and exalbuminous embryo, which bring it so near to Naiadeæ; whilst it differs from the five preceding orders of Nudifloræ, not only in the development of the perianth, but also in the stamens, which, even when definite, are not opposed to the perianth-segments, and in which the filaments are usually slender, and the anther-cells always opening inwards. On the whole it seems best to regard Alismaceæ as an anomalous order, connecting in some measure Naiadeæ with Hydrocharideæ, but more nearly allied to Nudifloræ than to any other series or alliance.

The Glumales are a group of orders established by Lindley and very generally recognized, although within different limits according to the special views entertained by different botanists, and with very different meanings attached to the term glume. Nor, indeed, can any limits or definition be given which shall admit of no exception. Generally speaking, in the five orders to which, after Lindley, I would limit the alliance (Eriocauleæ, Centrolepideæ, Restiaceæ, Cyperaceæ, and Gramineæ) the flowers are sessile or nearly so, and solitary within imbricate dry bracts termed *glumes*, forming heads or spikelets, which may be solitary or variously combined in heads, spikes, racemes, or panicles; the perianth is scarious or glume-like, and concealed under the glumes or entirely deficient; the ovary is free and uniovulate, or divided into uniovulate cells; and the seeds are albuminous. This definition excludes the Xyrideæ and Juncaceæ referred to the group by Steudel; for the former, although, like *Johnsonia* and its allies among Liliaceæ, they may have the imbricate dry bracts of Glumales, have nevertheless a very different ovary as well as the large petal-like perianths of Coronariæ, and the Juncaceæ never show the spikelets of the Glumales. On the other hand, there are a few species forming exceptions to the general character of the Glumales, although their general affinities require the including them in the alliance. Thus in Centrolepideæ there are often several flowers within each glume, or the glumal arrangement is entirely disturbed; and in a very few Restiaceæ (chiefly *Anarthria* and *Lepyrodia*) the glumes are shorter than the perianths and scarcely or not at all imbricate. These exceptions will be further considered after a few preliminary observations on terminology.

Great confusion has arisen from the varied use made by different botanists of the names given to the organs enclosing the essential parts of the flowers of Glumales. These organs are sometimes perianth-segments, but more frequently bracts or bracteoles, performing the functions of very much reduced or absent perianths. And there would be no absolute error in the uniform employment of the three terms, bracts, bracteoles, and perianth-segments, whenever the distinction between the three is clear, and of the more general terms scales or setæ when it is as yet doubtful to which of the three categories the organ belongs. But in accordance with a very general rule applicable to a variety of organs, as the biological functions of these bracts or bracteoles increase in importance, so also do their characters acquire fixity; and there is therefore great convenience, at least in the three large orders Restiaceæ, Cyperaceæ, and Gramineæ, in the general introduction of the term glume for the primary bracts of the spikelet, and of some special ones, such as perigynium, palea, lodicule, &c., for special modifications of the secondary scales in particular groups. It is, however, very essential for a correct understanding of the floral structure, that, whenever possible, a definite meaning should be given to each term used.

In the three typical glumal orders the term *bract* might be used only for those which subtend the spikelets or the branches of the inflorescence when compound. These bracts are very general, but not universal, in Restiaceæ and Cyperaceæ, very rare but occasionally developed (as, for example, in *Sesleria*) in Gramineæ.

Glumes, in their proper sense, are the imbricate scale-like bracts inserted on the axis of the spikelet; and, following out the views of Mohl and others of the most distinguished among recent organologists, the term should, in these three orders, be applied to *all* the bracts so inserted, irrespectively of any modifications of form or venation, or of the greater or less development or total absence of the axillary flower, and to no others.

These glumes are universally present in the three orders, and with very few exceptions (as in *Anarthria* and *Lepyrodia*) closely imbricate. Generally speaking, one or two, or sometimes more of the lowest, and occasionally one or more at the end of the spikelet, are empty and usually smaller than the others. Sometimes, however, and especially in some uniflorous spikelets, the uppermost or all of the lower empty glumes is larger or differently-shaped from the others. In androgynous, unisexual, or polygamous spikelets, the glumes frequently differ considerably in form, size, or venation, according as they enclose hermaphrodite male or female flowers or are quite empty; but their alternate imbricate insertion (whether distichous or all round) on the main axis of the spikelet is always constant.

The special terms conveniently applied to the peculiar scales observable in some genera or orders within the glumes on the secondary or floral axis will best be considered under the several orders, on which I shall now offer a few observations. These observations will not be so much directed to the several distinctive characters of the orders, which have been too clearly explained by various botanists to require further comment, as to the various modifications which the spikelets with their glumes and other scale-like organs undergo, and which have given rise to the confused terminology it is my object to expose.

Eriocauleæ have on each scape or peduncle a single terminal spike with closely imbricate bracts, each enclosing a single flower, or the outer ones empty, thus answering to the general character of the spikelet and its glumes; but as the axis of the spike or receptacle is a direct prolongation of the peduncle or scape without any distinctly subtending bract, as the spike itself takes the globular or depressed form usually designated by the term head, very rarely lengthening to a cylinder, and as the imbricate bracts have often a somewhat herbaceous or flaccid consistence not directly associated with the idea of a glume, there appears to be no inconvenience in retaining in this order, as is usually done, the more general terms of flower-head (capitulum) with its imbricate bracts, bearing always in mind their strict homology with the spikelet and its glumes of the larger glumal orders.

The flowers of Eriocauleæ are unisexual, arranged in androgynous or rarely unisexual heads; and although concealed under the bracts except the anthers and stigmatic tips, they are almost always more or less stipitate, and on their stipes or pedicel, or on the floral axis continuous with this pedicel, are usually 6 or fewer hyaline scales in two series—the upper or inner series close under the stamens in the males, or under the ovary in the females, the outer or lower series often much lower down and sometimes at different heights (see Plate VII.). In many species those of the upper series are, in the male flowers, reduced to small teeth or entirely wanting, and are also occasionally deficient in the females; those of the lower series are sometimes in one or both sexes reduced in number or entirely deficient, or are united in a single spatha-like scale; but their homology is the same in both sexes, and they appear to be quite correctly termed perianth-segments. Yet they are often called by other names, and differently so in the male and female flowers. Thus Lindley and some others have even described those of the outer series as glumes, although they are never glume-like either in consistence or insertion; and most monographers describe the upper portion of the stipes or axis of the male flowers as the solid tube of the inner perianth. Setting aside the contradiction of terms implied in the expression "solid tube," this interval between the outer and inner series of segments is no more a part of the inner one in the males than in the females, where it is never so described, or than in some species of *Campanumæa* and a few other Dicotyledons, where the calyx is attached to the stipes at some distance below the ovary and corolla. It is true that in the female Eriocaulons the two series of segments are sometimes close together, and the interval between the two is generally shorter than in the males; but they are sometimes also as distant as in the males, or both series are at some distance below the ovary. In some species one or both series are deficient. I am not aware of any bracteoles having been observed in Eriocauleæ below the perianth-segments.

The small order Centrolepideæ, which, from the structure of its ovary and seeds and other characters, must be placed in close proximity to Eriocauleæ and Restiaceæ, is nevertheless anomalous as well as much diversified in its floral arrangement. The inflorescence is a small terminal head or spike as in Eriocauleæ, but usually more or less compound, although the bracts or scales are very much reduced in number and often in size. The nearest approach to the normal spikelet is in *Aphelia*, where the bracts are distichously imbricate, the upper ones, or nearly all, enclosing each a single flower. If, as stated by Hieronymus, in his careful and elaborate monograph of the Order, these flowers were really all constantly solitary and hermaphrodite in *A. cyperoides*, that would be an example of a typical spikelet with distichous glumes; but in the specimens I have examined I have always found two flowers, one or both male only, in the lowest bract, and sometimes also in the second; and in all the other species artificially separated by Hieronymus under the name of *Brizula*, the lowest one or two bracts contain two or more flowers, usually males, and each of the other bracts a single flower only, but a female one. In *Centrolepis* there are usually only two primary bracts; but the flowers are generally two or more together within each, above twenty in *C. Banksii* and *C. exserta*, and so densely crowded on so short an axis that their precise arrangement is not easy to trace. Hieronymus describes this partial group as a centrifugal *cicinnus* (a cyme reduced to a single branch). I have, however, felt convinced, especially after a careful examination of those species where it is most developed, that it is, on the contrary, a centripetal, unilateral, or rather secund spike—that is, that the flowers, though affixed round the short axis, are all turned to one side, the lowest being the first developed. Under each flower, in most of the species, are one, two, or three very thin and slender hyaline scales; as one of these is almost always immediately under a stamen, and the other one or two more lateral, they may possibly represent a reduced perianth, but are perhaps more likely to be bracts and bracteoles. Upon the whole, however, with this uncertainty as to their homology it may be better in Centrolepideæ to make no use of the term glume, but to retain the name of bract for those which are on the primary axis of the inflorescence, and to designate as scales the hyaline ones within the bracts. In the little genus *Trithuria* the minute flowers are numerous in a nearly globular head, as in *Eriocaulon*, but with only a few bracts towards the circumference, the stamens and pistils being densely crowded in the rest of the head without intervening bracts or scales.

In the great majority of Restiaceæ the glumal arrangement is normal, whilst the perianth, although not protruding beyond the glumes, is as regularly developed with its six dry or scale-like segments as in the Junceæ; and yet, by some singular perversion of terms, these perianth-segments are by several botanists described under the name of glumes, which is never applied to their homologues in Junceæ. In a few genera or species, however, the typical arrangement is apparently at fault. Thus in the two above-mentioned small genera *Anarthria* and *Lepyrodia*, the glumes are small and not closely imbricate, and there are usually two bracteoles under the perianth, bringing these genera nearer to Junceæ, from which, however, they are constantly distinguished by their pendulous orthotropous ovules. In the females of *Leptocarpus Brownii* and a few allied species, the flowers and surrounding scales are so densely crowded in the compact compound inflorescence that it is sometimes very difficult to draw the line between the bracts, glumes, bracteoles, and perianth-segments, whilst in the males of the same species the spikelets are quite normal. In the monotypic genera *Onychosepalum* and *Chætanthus*, the perianths are reduced to small hyaline scales or setæ, and the habit is quite that of some Cyperaceæ; but they have always the leaf-sheaths slit to the base and the pendulous ovules of true Restiaceæ.

In Cyperaceæ the glumal arrangement is usually normal, as in Restiaceæ; but the perianth is, with few not very certain exceptions, either deficient or reduced to small hyaline scales or setæ; and the presence of bracteoles or of a so-called perigynium within the glumes is much more frequent than in Restiaceæ. The term glume, however, is not so generally used by cyperologists as I think it ought to be; several irregularities, which seem scarcely justifiable, have crept into their terminology; and in a very few genera there are real difficulties in describing properly the parts of the spikelet. A few instances may here be given in illustration of these irregularities in diction or in reality.

In *Kyllinga* the spikelet has been described as having usually four scales or glumes, of which two lower ones small and empty, and two larger flowering ones enclosing one flower. Now, as in the general character of the order each flowering scale is said to enclose one or rarely more flowers, it was difficult to conceive how a spikelet with two flowering scales should have but one flower; and on examination the fact proves to be that in most species of *Kyllinga* the spikelet has but three glumes, two empty and one flowering one. What has been termed the lowest small scale is not part of the spikelet at all, but is a bract inserted on the receptacle or main axis of inflorescence, and subtends the spikelet; the next scale, though still small and hyaline, is rather larger or sometimes considerably larger than the bract, and is the lowest empty glume of the spikelet. The next or upper empty glume or scale, is very different from the lower one, being much larger, broader, of a firmer consistence, and many-nerved; the third, or flowering glume, is so close above it as to appear almost opposite, and is very similar to it, except that it is sometimes larger, sometimes smaller, with one nerve more or less on each side. After flowering, the short floral axis becomes articulate between or below the empty glumes; and the ripe caryopsis, or nut, in falling away, carries with it the closely enveloping upper empty glume as well as the flowering one; and this it is which gave rise to the defective expression "two flowering glumes." In some *Kyllingæ* there may be one or two additional small empty glumes below or above the articulation; and occasionally there is a second flower, that, however, is not placed in the glume which is immediately below the ordinary flowering one, but just above the normal flower, apparently within the flowering glume, but really on a slight prolongation of the axis of the spikelet, in the axis of a small sometimes almost rudimentary glume. The two nuts, like the single one, are enclosed immediately within the normal flowering glume, and outside that, within the upper empty glume; the second flower, when present, is usually male only. This double envelope of the ripe caryopsis does not, to my knowledge, occur in any species of *Cyperus*; and therefore I cannot concur in the union of the two genera as proposed by F. Mueller. At the same time the *Kyllinga macrocephala*, A. Rich., from Abyssinia, and a few other several-flowered species, referred by some authors to *Kyllinga* on account of their habit, may be better considered as true *Cyperi*.

Boeckeler describes as a prominent distinctive character of *Kyllinga* the flower resting on a *disk*. I can find no expansion of the torus or gynophore which could justify the use of that term; nor, indeed, can I realize what he had in view, unless it be the persistent base of the floral axis, for which the word disk would certainly be a misnomer (see Plate VIII. fig. 1)*.

---

* Herr Otto Boeckeler has, in vols. 35 to 39 of the Linnæa, described in detail the whole of the Cyperaceæ contained in the rich collections of the Royal Herbarium, Berlin. As far as I have followed him, I have found him very accurate; and he has had access to authentic specimens, enabling him to clear up much of the confusion created by Nees and by Steudel. If, therefore, I have been led to make some critical observations on some of the terms he has used, and if I cannot agree with him as to the distinctness of some of the forms he has admitted as species, I am far from wishing to detract from the great value of his work.

The double enclosure of the caryopsis in the flowering glume and upper empty one occurs also in the small or perhaps monotypic allied genera *Courtoisia* and *Remirea*, which, however, are sufficiently distinct from *Kyllinga* in the shape and texture of the glumes as well as in habit and inflorescence.

Within the glumes of some genera of Cyperaceæ, on the secondary or floral axis, and outside or below the stamens or ovary, are certain scales or sometimes setæ, very much diversified in number, shape, and relative position, the terminology of which has been very much confused, and requires settlement according to fixed rules, in so far as their probable homology can be fairly exhibited, and more especially so on the present occasion, with a view to comparison with that of Gramineæ.

In the majority of the species of *Hypolytrum* (Plate VIII. fig. 6) there are at the base of the floral axis two distinct apparently opposite concave or complicate keeled scales, placed laterally with regard to the axis of the spikelet and to the subtending glume, and no others. These, from their position and other characters, may fairly be considered as bracteoles, analogous to those of *Anarthria* and *Lepyrodia* in Restiaceæ, or of *Xyris* and of several genera of Coronariæ. In *Hypolytrum pungens* these two bracteoles are united by their margins next the axis of the spikelet nearly to the apex into a single flat two-keeled scale, open on the anterior face only (next the glume) for the emission of the stamens and pistil. In *Platylepis* (Plate VIII. fig. 7) the union is the same, but more complete at the apex, the whole scale being produced into a short, solid, but flat point. The keels are lateral as in *Hypolytrum*, but broadly winged; and the bracts at their very base are rather obliquely inserted. In *Ascolepis*, a genus closely allied to the *Platylepis capensis*, the scale is more oblique, and consists chiefly of a long solid point, with a short fissure at the base for the stamens and pistil. In *Hemicarpha* the scale is exceedingly reduced; it is flat, or slightly concave, entire, or 2-toothed at the apex, very thin and hyaline, often very difficult to detect, and sometimes disappears altogether. That it is, however, homologous to the scale of *Platylepis*, and not, as suggested by Boeckeler, a staminode, is shown by the frequent bifurcation of its apex; and occasionally (as in a flower examined of *H. occidentalis*, A. Gr.) where there are two stamens the scale is below one of them. Whether this usually rudimentary and occasionally absent organ is sufficient to remove the two or three species from *Scirpus* is another question*.

In *Lipocarpha* (Plate VIII. fig. 5) there are two scales enclosing the flower, as in *Hypolytrum*; but they are quite flat and placed fore and aft, parallel to the subtending glume, which may leave some doubt as to their homology, whether with the bracteoles of *Hypolytrum*, or with the inner scales of *Mapania* and *Pandanophyllum* to be presently referred to.

In the large cosmopolitan and familiar genus *Carex*, the female flower is well known as enclosed in an organ which, from its shape, has been generally called a utricle, the nature of which has been much discussed, but is now generally admitted to be composed of the union of two scales or bracteoles, as well illustrated by Dr. M'Nab and Mr. Dyer in the 14th vol. of our Journal. Of this explanation there can be no reasonable doubt, though there are still some puzzling characters which slightly invalidate the strict homology of this utricle with the bracteoles of *Hypolytrum*, especially the occasional development of an additional axis of inflorescence within the utricle, and the constant absence of all trace of the utricle in the males, whilst it never fails in the females. However this may be, the organ is so peculiar and so necessarily noticed in every specific description of Cariceæ, that there is great convenience in giving it a special name, for which the term *perigynium* is now generally adopted. Its homology with the above-mentioned scale formed of the united bracteoles in *Platylepis* and *Ascolepis* is so very probable, that there is no objection to giving to that organ also the same name (bracteolæ in perigynium connatæ), and even to the pair of distinct bracteoles of *Hypolytrum*, although here it may be better simply to call them bracteoles. But the giving the same name of perigynium to parts of the flower or fruit which are not even distinct organs, as has been recently done, can only mislead and produce confusion. Thus, in *Ficinia* and the allied genera *Hemichlæna* and *Acrolepis*, Boeckeler uses the term perigynium for what Kunth more correctly calls the disk, a slight expansion at the apex of the gynophore or stipes under the ovary; and the so-called perigynium of *Anoporum* is nothing more than a cellular and rather hard thickening of the pericarp, below and more or less round the seed-bearing cavity, observable in the ripe caryopsis of several Cyperaceæ belonging to various genera. This genus *Anoporum*, originally founded by Nees on the *Cyperus cephalotes*, has, under Boeckeler's revision, become an unnatural amalgamation of four or five *Cyperi* taken from very distinct sections of the genus, with *Scirpus cubensis*, Kunth, to which has been added as a synonym the *Oxycaryum Schomburgkianum*, Nees, a Guiana plant resembling it in aspect but with differently shaped glumes and without that thickening of the pericarp supposed to be characteristic of *Anoporum*. Grisebach has recently, and perhaps correctly, reduced *Oxycaryum* to a section of *Scirpus*; and the other *Anopora* must be restored to *Cyperus*.

---

* In the 'Flora Honkongensis' I followed the received terminology in describing the flower of *Hypolytrum* as a 1-flowered spikelet; but I had not then had the opportunity of following out the homology through *Platylepis* on the one side and *Mapania* on the other.

A still less intelligible misnomer appears in the descriptive works of some German and Italian botanists, who give the name of perigonium (usually taken as a synonym of perianth) to the hyaline wings which border the angles of the rhachis in the spikelets of some Cyperi. These wings are decurrent from the margins of the glume next above; and though they sometimes become detached in the shape of small scales, they have no connexion whatever with the flower of which they are represented as the perigonial scales.

In some Cyperaceæ, within the bracteoles or independently of them, and immediately under the stamens or alternating with them, or even apparently almost within them, are six or fewer, rarely more than six, setæ or narrow usually hyaline scales. These are very generally supposed to represent perianth-segments; and there is every reason to believe that that is their real homology. Yet this is scarcely yet absolutely proved, and it may be better to continue to describe them by the general terms of hypogynous setæ or scales, which commit the author to no theory. Amongst the genera which have no bracteoles, it is in *Fuirena* that they come the nearest in appearance to true perianths. They there consist usually of three short, broad, hyaline scales, alternating sometimes with three setæ. In *Scirpus* and several of its immediate allies, they are usually all reduced to setæ, six being apparently still the normal number; but they are often reduced in number or very unequal and irregular, exceedingly deciduous or entirely wanting, and even varying in these respects in the same species, on which account Boeckeler and others have reunited *Isolepis* with *Scirpus*. In a few species of *Scirpus*, *Rhynchospora*, etc. the number is often slightly increased, and in some species of *Erio-*

phorum they are very numerous, and lengthen much after flowering, becoming white and silky, and assuming that appearance which has given to the plants the name of *Cotton-rushes* or *Cotton-grass*. This irregularity in numbers has been one of the chief objections raised to the assimilating these hypogynous setæ to perianth-segments. It must, however, be borne in mind that in Monocotyledons, as well as in Dicotyledons in genera or orders in which a definite number of stamens and perianth-segments is the rule, there are sometimes exceptional species where either the stamens alone or the perianth-segments also are indefinitely multiplied.

Amongst the bracteolate genera of Cyperaceæ, *Mapania, Pandanophyllum, Diplasia, Lepironia,* and perhaps two or three others which I have not had the opportunity of carefully examining, have hypogynous scales usually long linear and narrow though flat, and always within the two bracteoles. These, however, have not been generally recognized as the homologues of the setæ of *Scirpus* and its allies, but the whole flower, with its stamens, scales, and bracteoles, has been described as a secondary androgynous spikelet formed of glumes, monandrous male flowers, and a single terminal female flower, a view in which I am unable to concur on the following grounds:—1. The whole spike supposed to be compound has precisely the structure and aspect of the simple spikelet with its numerous closely imbricate glumes, each completely enclosing what I should consider as a single flower. 2. The scales within each glume are not arranged regularly on the axis (all distichous, or all more or less spiral), as is always the case in normal spikelets, but the two outer ones are nearly opposite like bracteoles, and all the others inserted higher up and as nearly as their mutual pressure will allow in a 1-seriate or 2-seriate whorl, an arrangement never observed in a true spikelet. 3. The stamens are not regularly placed one within every scale, as is the case with the true androgynous spikelet of the Sclerieæ; but scales with and without stamens either alternate with each other or are irregularly mixed in the whorl, or, as is very plain in *Diplasia*, the stamens are in a distinct whorl within the whorl of scales.

On the other hand, the genera *Chrysithrix* and *Chorisandra*, inaptly included by Boeckeler in the Hypolytreæ, have the true androgynous spikelets of the Sclerieæ, and were on that account more correctly placed by Kunth in the latter tribe.

The fine genus *Pandanophyllum*, probably too much subdivided by Kurz, in the 38th vol. of the Journal of the Society of Bengal, has been, I think, inappropriately united with *Lepironia* by Miquel in his 'Illustrations de la Flore de l'Archipel Indien;' but I do not see how it is to be separated from Aublet's genus *Mapania* (Plate VIII. fig. 8), of which my original *Hypolytrum pycnostachyum*, from Panama, is a second American species (*Mapania pycnostachya*). Both in the New and the Old World, the number of scales within the bracteoles appears to vary from 3 or 4 to 6; and in the flowers I examined I found 2, 3, or 4 stamens, and the habit is very much the same. I thought at first that *Mapania* might be distinguished by the very long leafy development of 1, 2, or all 3 of the involucral bracts and the numerous spikelets in the head, whilst in *Pandanophyllum* the spikelets are often solitary or few, and the involucre does not exceed them; but under this view *Mapania africana*, Boeckel., would be a *Pandanophyllum*, and Miquel's *Lepironia macrocephala* (*Cephaloscirpus*, Kurz), as well as two unpublished African species, would become *Mapaniæ*; and a species from Samoa, and perhaps another from Africa, are in many respects intermediate. We must therefore, I fear, sink *Pandanophyllum* into *Mapania*.

Lepironia, Rich., or *Chondrachaë*, Br., has so very different a habit, that the multiplication of inner scales added to the single lateral spikelet may justify the retaining it as a genus. The Australian plant may be, however, specifically distinct from the original Madagascar species.

Diplasia (Plate VIII. fig. 9) has very nearly the structure of *Mapania*; but the stamens and scales appear to form two distinct whorls, one within the other; and the scales are often, when young, united in a tube, at least at the base, which, together with the peculiar, oblong, flat caryopsis with a thick pericarp and small terminal cavity, characterize it generically. The habit of the typical species is very different, the long narrow spikelets being widely paniculate. But it is only to this genus I can refer Spruce's no. 3833, from North Brazil, with a densely capitate inflorescence, unfortunately distributed under the name of *Hypolytrum pycnostachyum*, Benth., of which it has the habit, but which I have above referred to *Mapania*. Spruce's plant may be characterized as in the subjoined note*.

---

* DIPLASIA PYCNOSTACHYA, sp. n. Folia radicalia 1–3-pedalia, $\frac{1}{2}$–$\frac{3}{4}$ poll. lata, margine scabro-serrulata v. demum vix lævigata, in petiolum basi vaginato-dilatatum longiuscule contracta. Scapus triqueter, scaber, 1–$1\frac{1}{2}$-

In the large and familiar order of Gramineæ, the glumal arrangement is again typical; but, owing to some strikingly modified relations in form and size of the upper and lower, or of the flowering and empty glumes observed in a large number of species, the terminology adopted by botanists has been very unsettled, and repeatedly modified, since Linnæus first endeavoured to assimilate the spikelet to a flower with its calyx and corolla. For these terms Jussieu substituted those of glume and calyx; and the latter name appears to be still retained by Baron F. v. Mueller and a few others, notwithstanding that the absence of all homology between the so-called sepals in Grasses and those of perfect flowers has been so repeatedly demonstrated. Other botanists have variously proposed or adopted the terms tegmen, glume, epicenium, peristachyum, tragulum, glumella, palea, lodicule, nectary, etc. for the various scales which enter into the composition of the spikelet, thus giving an appearance of complexity to an arrangement which is really as simple as that of Cyperaceæ, and generally homologous with what may be observed in that order.

When, some five and twenty years since, I began drawing up the generic characters of Grasses for my 'Handbook of the British Flora,' I purposed following the terminology of Kunth, knowing him to be the most accurate as well as the most experienced among the agrostologists of the day; but I was soon brought to a standstill by the anomaly of the spikelet of *Milium* being described as having two flowers and one glume, when I could not expect any of my readers to see more than one flower with three glumes. This induced me to pause till I had carefully examined a great variety of genera, and compared them with the nearest allied Monocotyledonous orders. The result was that it appeared to me that no distinct and universally applicable defi-

---

pedalis. Involucri bracteæ ad 3, longe foliaceæ, valde inæquales (minor angustissima, 3–4-pollicaris, maxima latior subpedalis). Spiculæ 15–20, ovoideo-globosæ, in capitulum densum sessile confertæ. Glumæ numerosæ, oblongæ, multinerves, 2 lin. v. paullo longiores. Squamellæ hypogynæ, tenuissime hyalinæ, apice sæpius lacero-multifidæ, sub fructu fere evanidæ, 2 exteriores (bracteolæ) complicato-carinatæ, 2–4 interiores basi plus minus in tubum coalitæ. Stamina (3–4?) intra squamellas hypogyna. Stylus semi-2-fidus, deciduus. Caryopsis oblonga, valde compressa, 2 lin. longa, pericarpio duro crasso albo, parte seminifera prope basin parva nigricante. *Hab.* in Brasilia boreali ad cataractam fluvii Taruma prope Barra do Rio Negro, *Spruce*, n. 3833. Specimina omnia, fructu maturo, staminibus stylisque plerumque jam delapsis, staminum numerum non plane ostendunt.

nition of the term glume could be given, unless it were applied, as in Cyperaceæ, to the whole of the primary imbricate scales attached to the main axis of the spikelet, whether enclosing a hermaphrodite unisexual or semi-abortive flower or quite empty—and that other names must be given to the secondary scales inserted within the glume under the flower on the secondary or floral axis. I drew up my generic and specific characters accordingly; and it was only after they were in print that I ascertained that similar views had been independently propounded by Hugo Mohl, Döll and others, in Germany, and more recently by Germain de St. Pierre, in France. The consequent terminology has since been adopted by Dr. Hooker and by Prof. Oliver, but not, I believe, by systematic botanists generally. Those who have long devoted themselves specially to grasses have been so used to consider the flowering glume and its enclosed palea as two paleæ, and the lower empty ones alone as glumes, that they find it inconvenient to adopt a new language, and have adduced arguments in support of their practice, which may appear specious, and may require some further observations in reply; in illustration of which I shall select examples from some of the most familiar genera of Grasses, of which a few diagrams are given in Plate IX.

Whilst insisting on two great laws in terminology—that *homologous and generally similar organs should be designated by the same name*, and that *where the want of homology of two organs has been demonstrated they should be called by different names*, I would nevertheless admit, as an exception to the first rule, that *where in a series of homologous organs a certain number of them are regularly modified in consequence of a difference in the functions they are called upon to perform, it may be convenient to describe them under a different name.* If, therefore, those glumes which in the spikelet of Gramineæ enclose a flower, and are thus called upon partially to replace the perianth, were constantly different from the empty ones, it might have been convenient to give them a distinct name; but it is easy to show that no such difference is at all regular, and that even where the flowering glume is in a slight degree modified the assimilating it to the palea is most inappropriate and misleading.

In several of our large genera of Grasses, the only difference between the one or two outer empty glumes and the flowering ones is that they are rather smaller or rather larger, as is so frequently the case in Cyperaceæ and Restiaceæ, where no difference in their terminology is admitted; and even in this respect there is often more difference between the first and second empty glume than between the upper empty glume and the first flowering one; and in some cases, as, for instance, in the common Couch-grass (*Agropyron repens*) (Pl. IX. fig. 5), the empty and flowering glumes are precisely similar or very gradually diminish in size from the outer empty to the uppermost flowering ones. A particular empty glume in one spikelet may also correspond to a flowering one in another spikelet of the same plant. Thus in the Rye-Grass (*Lolium perenne*) (Pl. IX. fig. 6), the spikelets are alternately placed in one plane, right and left of the main axis of inflorescence, the single empty glume of each spikelet being the lowest and outer one, and therefore alternately the right-hand and the left-hand one, whilst the second glume, next the axis of inflorescence, is the lowest flowering one. In the uppermost spikelet, however, which, from the non-production of the main axis, is apparently terminal, there are two empty glumes: and this is not owing to the development of an additional outer glume; for the lower of the two empty ones is on the side it ought to be in the regular alternation with the lower spikelets; but the second glume, which in the lower spikelets encloses a flower, is in this subterminal one empty. So in several Paniceæ, the second or third glume, according to the genus or species, has been observed sometimes to enclose a rudimentary, or a male, or even a perfect flower, and at other times to be quite empty without any consequent change in its appearance. It has then been termed either one of the paleæ of the enclosed flower, or, when empty, a *neutral flower*. Now in all other orders, whether Monocotyledonous or Dicotyledonous, a neutral flower signifies one in which the floral axis with the perianth (always regarded as part of the flower) are developed, but the organs of both sexes are either sterile, rudimentary, or deficient; but in these so-called neutral flowers in Gramineæ the whole flower, perianth, bracteoles, axis and all, is deficient, and there remains nothing but the subtending bract, which is in no other case regarded as a part of the flower, still less as a whole flower. Thus in *Panicum* (Pl. IX. fig. 3), according to the Kunthian terminology, the first minute scale is a glume, the second, many times larger, is also a glume, the third, often precisely similar to the second, is not a glume but a flower, and the fourth, whether similar or more or less dissimilar, is a part of a flower. In some Gramineæ there are additional empty glumes, usually small and often different in form, either immediately below the flowering ones, as in *Antho-*

xanthum (Pl. IX. fig. 2) and *Phalaris*, or at the end of the spikelet, as in *Melica*. These have also been often termed neutral flowers, although they have no pretensions to be flowers at all. In some genera, as in *Uniola* (Plate IX. fig. 4), from three to six of the lower glumes are empty, and precisely similar to each other, only differing from the flowering ones by being rather narrower and closer together; and yet we are only allowed to call the two lowest ones glumes, the others are termed flowers. We are not even allowed to define glumes as the two lowest scales of the spikelet; for that of *Leersia* (Pl. IX. fig. 1), which has two glumes, one empty, the other flowering, is described as having no glumes but two flowers. In *Kyllinga* and *Courtoisia*, in Cyperaceæ, where the fruit is similarly enclosed in two glumes, they are correctly described as such, one empty, the other a flowering one.

De Candolle and others have described the small outer glume of *Panicum* as an additional bract; and this may be so far correct, inasmuch as all the glumes are bracts in the most extended sense of the word; but, as above mentioned, it is most convenient in the Glumales to limit the special use of the term bract to those which subtend the whole spikelet or the primary branches of the inflorescence. These, though very general, are not universal in Cyperaceæ, and very rare in Gramineæ. I am not aware of their presence in any British genus except *Sesleria*.

We now come to the contents of the flowering glume, and especially to the palea, commonly called the upper palea, which I need scarcely repeat is neither homologous nor similar to the so-called lower palea, or flowering glume. It is inserted on the axis of the flower, and not on that of the spikelet, as may be readily seen in any of our Grasses, and perhaps most distinctly in the cultivated wheat, where it is perceptibly raised above the base of the axis. It is differently shaped; and having instead of one central rib or keel two prominent nerves, it is generally supposed to be a double organ composed of the union of two scales. That these two scales are the homologues of the two bracteoles of *Hypolytrum* and its allies is very probable; indeed they most closely resemble, in position as in structure, the united bracteoles of *Hypolytrum pungens* and of *Platylepis*. At the same time this homology may not be absolutely proved; and as their presence and general structure is almost as universal as peculiar in Gramineæ, it is convenient to designate them by a special name, for which the generally received term palea is not inappropriate, and commits one to no special theory in regard to it.

One reason given for continuing to designate the flowering glume and palea as two paleæ is that they often spread equally like two parts of a perianth, and that after flowering they often both fall off with the enclosed fruit as if they had been together disarticulated from the axis of the spikelet. But in several species of *Carex*, or of other Cyperaceæ, as well as in some other plants, monocotyledonous or dicotyledonous, the bract is adnate to the pedicel or floral axis, or even to the perianth, and as the fruit ripens is detached with it from the main axis, without ever any such bract being taken as a part of the flower or as a lower bracteole. And as to the convenience of calling both the glume and palea by one name for the purpose of describing them together, that can but very rarely be done on other grounds; the two are almost always so different from each other that they must be separately described; and it appears to me that the accurate designation, flowering glume and palea, is not at all more cumbersome than the deceptive one, lower palea and upper palea.

It is objected also that in uniflorous spikelets the floral axis is in apparent continuation of that of the spikelet, and that it is then hard to ascertain on which axis the upper scale is inserted and thus to distinguish between the glume and the palea; but in the immense majority of genera and species there is no such real difficulty. There is generally an obliquity in the flower, and sometimes, as in *Phleum*, a short continuation of the axis of the spikelet behind the palea, independently of the evidence of the true nature of the upper scale almost universally to be derived from its two nerves without any midrib or keel. The really doubtful cases are exceedingly few, as, for instance, *Leersia* (Pl. IX. fig. 1), where the two scales of the spikelet are similar in form and venation, though the inner one may be rather narrower. The probability is that they are both glumes on the main axis, and that there is no palea, as is evidently the case in *Alopecurus*, where there are three glumes, the two outer empty ones often united, the third a flowering one, and no palea. But granting the exceptional uncertainty in *Leersia*, I would observe that in botanical terminology, as in organography, if we were to allow single exceptions to invalidate rules of otherwise universal application, we should have no general rules left.

The two or, rarely, three small scales above the palea and below or alternating with the stamens in most grasses, have been supposed to represent a reduced perianth; but their homology is not satisfactorily demonstrated, and they have therefore appropriately received a separate name; that of *lodicules* is the one generally adopted, and does not appear objectionable, although the classical meaning of the word may not be very applicable.

To sum up, therefore,—the spikelets of Gramineæ may be described as composed of a series of alternate glumes, distichously imbricated along the axis, one or two (rarely more) at the base of the spikelets and sometimes a few at the end empty, the others having each a single sessile flower in their axil, the short floral axis bearing a palea, two or rarely three lodicules, and three (rarely two) or six stamens under the terminal ovary.

In conclusion, I have only to add that in making these observations I have had nothing new to bring forward, my only object being to enforce a principle generally admitted, but unfortunately too much neglected by speculative botanists, viz. that to be really useful, descriptions should, in clear and intelligible language, not only enable the reader to identify the plant he has in hand, but call his attention specially to those characters which may indicate its real affinities, the homologies of its parts, and any other relations they may have. But for this purpose it is necessary that the author should distinguish descriptions of plants from theoretical explanations, that he should, in terms the most capable of strict definition, describe only what the observer may actually see, not what it may be theoretically imagined he ought to see, reserving his theories for comments upon what has been actually observed.

P.S. Since writing the above, a further detailed examination of *Lipocarpha* has tended to prove that the two scales within the glume are the homologues of the hypogynous scales of *Fuirena* and of the flat scale-like setæ of *Scirpus littoralis*—these scales being one in *Hemicarpha*, two in *Lipocarpha*, three in *Fuirena*, four in *Scirpus littoralis*, and deficient in *Scirpus* sect. *Isolepis*, genera all very closely allied to each other.—G. B.

DESCRIPTION OF THE PLATES.

PLATE VII.

Diagrammatic Illustrations of the Genus *Xyris*.

Fig. 1. Young bud showing the two bracteoles (*b b*) enclosing the outer perianth (*c*), which then completely envelops the inner perianth, of which the tube has not yet grown out.

Fig. 2. The same further advanced: the inner perianth in lengthening has forced up the outer one, which has left a scar where it had been attached, and is opening on one side to enable it to be cast off.

Fig. 3. The inner perianth expanded, having cast off the outer one.

Fig. 4. The same opened to show the position of the ovary at the base of the tube.

Diagrammatic Illustrations of the Genus *Eriocaulon.*

Fig. 5. *E. septangulare* ♂, showing the three outer perianth-segments much below the three inner small unequal ones, which alternate with the three stamens, with the gland-like rudiment of the ovary in the centre.

Fig. 6. *E. septangulare* ♀, showing the three outer perianth-segments a small distance below the three inner equal, erect, hyaline segments surrounding the ovary.

Fig. 7. *E. rosulatum* ♂, in which the three outer perianth-segments are united into a spatha-like scale; the three inner almost as in *E. septangulare,* but larger, with six stamens.

Fig. 8. *E. rosulatum* ♀, the outer perianth-segments distinct but reduced to two.

Fig. 9. *E. pusillum* ♀, the perianth-segments all linear-subulate, the outer ones at the base, the inner at the apex of the stipes or floral axis.

PLATE VIII.

Diagrams to illustrate the Homology of Parts in the Cyperaceæ.

Fig. 1. *Kyllinga cylindracea,* showing the spikelets disarticulated below the two large upper glumes, the small outer glume remaining on the base of the rhachis or axis of the spikelet, which is persistent and falsely described as a disk, the bract subtending the spikelet also persistent and very small. Both this bract and the small glume remain in some specimens persistent long after the upper part of the spikelet has fallen away; in other specimens they also fall away, leaving the base of the rhachis alone persistent on the general axis of inflorescence. In other species the articulation is at the base of the rhachis, and the small outer glume remains on the spikelet when it falls.

Fig. 2. Spikelet of a *Cyperus,* sect. *Pycreus,* the glumes corresponding to those of Gramineæ (Triticeæ, etc.), the two outer smaller glumes empty and usually persistent after the other flowering ones have fallen off with the enclosed nut.

Fig. 3. *Ficinia,* showing the disk (*d*), falsely described as a perigynium.

Fig. 4. *Cyperus columbetes,* showing the thick white cellular portion of the pericarp (*p*), also falsely described as a perigynium.

Fig. 5. *Lipocarpha,* the glume turned down, showing the two thin scales parallel to the glume, and therefore possibly rather perianths than bracteoles.

Fig. 6. *Hypolytrum,* two navicular bracteoles within the glume.

Fig. 7. *Platycarpha,* the two bracteoles united, and open only in an anterior fissure emitting the flower.

Fig. 8. *Mapania,* two free navicular bracteoles enclosing four (sometimes six) free flat scales, probably perianth-segments corresponding with the setæ of *Scirpus.*

Fig. 9. *Diplasia,* the flat hyaline scales within the bracteoles united in a flat ring round the ovary at the base, divided at first at the top into 4 to 6 lobes, but soon very much torn and jagged.

PLATE IX.

Diagrams illustrating the Homology of Parts in the Gramineæ.

Fig. 1. *Leersia*, two glumes nearly similar, or one larger with more nerves than the other and no palea, the inflorescence very nearly that of *Kyllinga* (compare Plate VIII. fig. 1).

Fig. 2. *Anthoxanthum*, six glumes, all dissimilar, but almost forming three pairs: (1) hyaline with a strong keel, the sides nerveless; (2) twice as large, rather firmer, with a strong keel and a prominent nerve on each side; (3) much smaller, ciliate on the margins with the keel produced into an awn free from above the middle; (4) like no. 3, but rather larger, the awn longer and free from much below the middle of the glume: (5) rather shorter, very broad, hyaline, obtuse, no awn, no cilia, and no keel, but one, sometimes three, very fine nerves; (6) like no. 5, but smaller and narrower with one very fine nerve.

Fig. 3. *Panicum*, four glumes: (1) small, empty, sometimes minute, 1- or 2-nerved; (2) much larger, empty, usually 3- or 5-nerved; (3) sometimes exactly like no. 2, sometimes much larger, empty, or with a palea only, or with a male flower in its axil; of these three, sometimes no. 2, sometimes no. 3 bears a long or short awn; (4) flowering glume, broad, smooth, of a firmer texture, nerveless, or with three fine nerves enclosing the palea and the flower.

Fig. 4. *Uniola*, glumes numerous; nos. 1 to 4, or sometimes 1 to 6 empty, and often but not always smaller; all the others having a palea and flower in their axils.

Fig. 5. *Agropyron*, glumes numerous, all similar, no. 1 and 2 empty, the others having a palea and flower in their axils.

Fig. 6. *Lolium*, spikelets alternating along the rhachis of the spike, each with several glumes, the external glume in each of the lateral spikes empty, the others having a palea and flower in their axils, but in the terminal spikelets no. 1 and no. 2 both empty, no. 1 strictly corresponding in position to the external one in the lower spikelets; but no. 2, which encloses a flower in the lateral spikelets, is empty in the terminal one.

INDEX.

Page

Abortion, how affecting superposition in flower 468

Abutilon? sp., from Tanganyika region 90

Acacia, account of ant-colonies in . 398

—— sphærocephala, glandular bodies, F. Darwin on minute structure of 399

Acalypha, sp.? 92

Acanthad, staminal pistillody in, by S. Le Marchant Moore . . 86

Acanthophora Thierii . . 235, 238, 447

Acer Campbelli, 132; caudatum, 132; Hookeri, 132.

Aceras angustifolia 120

Acetabularia calyculus . . . 237, 489

Achnanthidium coarctatum . . . 55

Achyranthes javanica? 139; scandens, 139.

Aclisia? Thomsoni, *C. B. Clarke*, *n. gen.*? next Aneilema . . . 121

Aconitum palmatum 134

Acrocladium politum 71

Acrostichum aureum, 80,111; conforme, 421; repandum, var. Quoyanum, 111; scandens, 111; schizolepis, *Baker*, *n. sp.* 421; spicatum, 421; squamosum, 421; Thomsoni, *Baker*, *n. sp.* 111; viscosum, varieties, 421.

Acrotylus prismaticus 468

Actiniceps, *n. gen. Berk. & Broome* 85

—— Thwaitesi, *Berk. & Broome*, *n. sp.* 85

Actinidia callosa 133

Actinobrichia rigida 455

Actinocyclus Challengeri, *O'Meara*, *n. sp.* 58; Oliveranus, *O'Meara*, *n. sp.* 58; Ralfsii, 57.

Actinodaphne, sp.? 139

Actinotrichia rigida 244

Adenocystis Lessonii 198

Adiantum æthiopicum, 414; affine, 424; lunulatum, 106.

Admiralty Islands, Algæ of, collected by Mr. Moseley, of 'Challenger,' 238; character of country and geology of, 74; climate of, 75; food, implements, and clothing, inhabitants of, Mr. Moseley on, 30; fruits and seeds of, 76; Mr. Moseley's general remarks on plants of, 73; orchids of, 76, 112; palms of, 78; pigeons of, transporting seeds, 77; ropes of natives of, 80.

Page

Æcidium palustre 394

Æschynanthus bracteata. . . . 145

Agaricus, alpinæ, 368; alphitophorus, *Berk. n. sp.*, 48; armeniicus, 365; asterocephalus, 366; atrorufus, 53; atropurpureus, 366; Boryanus, 366; brachypus, 366; bulbipes, 365; campanella, 367; campestris, 221; cepæstipes, 365; chloriticus, 366; citriceps, 366; cnemidophorus, 368; convolvulus, 366; coprinopsis, 365; erythrellus, 366, euomphalus, 367; exsanguis, 366; flavolivens, 367; fulvellus, 368; furfuraceus, 221; Gardneri, 367; glebarum, 53, 54; glypholoma, 365; helictus, *Berk.*, *n. sp.* 48; hypnorum, 53; hypoleucus, 367; ianthinophæus, 367; Jacksoni, *Berk. & Cooke*, *n. sp.*, 367; januarius, 368; kerguelensis, 221; macromphalus, 366; macropilus, 365; marasmiodes, 368; molybdites, 365; nauseabundus, 367; ochropodius, 368; odontellus, 366; œnocephalus, 365; pardalotus, 365; Panurensis, 368; phylicegena, *Berk.*, *n. sp.*, 52; pileum-Turcicum, 367; pistillipes, 366; plorans, 367; prægrandis, 365; psamminus, 368; rheicolor, 366; rhytopilus, 368; rudis, 365; sapineus, 49; smaragdinus, 367; smidioides, 368; submurinus, 366; tegulicius, 365; Trailii, *Berk. & Cooke*, *n. sp.*, 368; trichrous, 365; vespertilio, 365; violaceo-marginatus, 367; Weddellii, 365; xylocharis, 367.

Page
Agrimonia eupatorium 142
Agrostis alba, 119; vulgaris, 119.
Agrostocrinum, a subgenus of Cæsia 357
Ahnfeltia concinna, 454; plicata, 46, 201.
Ainsliæa pteropoda 148
Alectoria ochroleuca 227
Alectoriei 227
Algæ from:—Admiralty Islands, 238, 489; Alaski Channel, Japan, 449; Aru Islands, 241; Banda Islands, 240; Bermuda, 488; Cape-Verd Islands, 488; Falklands and Magellan Straits, 487; Fiji Islands, 242; Hawai (Sandwich Islands), 454; Honolulu, 453; Japan, 486; Juan Fernandez, 452; Kerguelen (marine 198, freshwater 205, & 445); Mangaia Island, South Pacific, 30; Osima Harbour, Japan, 450; Papeetee Harbour, Tahiti, 486; Philippines, 242, 489; Polynesian &c., 235; Raoul Island, 241; Tahiti, 455; Tongatabu, 489; Torres Straits, 446, 489; Valparaiso, 486; Yokosha, Japan, 451.
——, colouring matter of, red groups, 34; six kinds of colouring matter soluble in water, 35; physical properties of colouring matters, 38.
Alismaceæ, a puzzling order to interpret, Mr. Bentham on . . 501
Allantodia brunoniana 155
Alsophila bullata, *Baker*, *n. sp.*, 412; Colensoi, 423: latebrosa, 152; polyphlebia, *Baker*, *n. sp.*, 104; vestita, *Baker*, *n. sp.*, 412.
Alwisia Bombarda 84
Amansia glomerata 447
Amarantacea (Achyranthes?), sp. from Tanganyika region . . . 92
Amarantaceæ of Tonglo 139
Amaryllidæ, what included therein by G. Bentham 494
Amaryllidaceæ of Darjeeling . . 120
Amblystegium decussatum, 68, 72, 196; fluitans, 196; uncinatum, 68, 196.
Ammolirion, a subgenus of Eremurus 279
Amphidium molydoplacum, *Nyl.* *n. sp.* 181
Amphiprora parva, *Reinsch*, *n. sp.* 205
Amphiroa Cumingii, 244; dilatata, 450; fragilissima, 239, 242, 243, 488; Gaillonii, 450; involuta, 239, 240.

Page
Anabaina confervoides, *Reinsch*, *n. sp.*, 209; involuta, *Reinsch*, *n. sp.*, 209.
Anacardiaceæ 136
Anadyomene flabellata . . 245, 489
Anaphalis adnata, 148; araneosa, 148; cinnamomea, 147; tenella, 148; triplinervis, 147.
Andreæa acuminata 68, 196
Andrœcium and Perianth, their relative position in Tiliaceæ and Olacaceæ 471
Andromeda ovalifolia 135
Aneilema longifolia 92
Anemarrhena, *Bunge* 268
—— asphodeloides 268
Anemone in Tonglo? 133
Aneura multifida, 197; palmata, 61.
Angiopteris evecta 159
Animi, a subfossil gum copal, Dr. J. Kirk on tree which yielded this 234
Anisadenia saxatilis 136
Anisothecium vaginatum . . . 193
Anonaceæ 133
Antarctic Lichens, remarks on . . 180
Antennaria pannosa 394
Anthericeæ and Eriospermeæ, J. G. Baker on Revision of genera and species of, 253; table characters, tribes, and genera of, 258.
Anthericum, *Linn.* 290
—— Aitonia, 294; anceps, *Baker*, *n. sp.*, 305; angulicaule, *Baker*, *n. sp.*, 305; angustifolium, 300; asperatum, 310; brasiliense, *Baker*, *n. sp.*, 306; Brehmeanum, 315; brevicaule, 298; brevifolium, 298; Burkei, 298; Cameroni, *Baker*, *n. sp.* 96, 314; canaliculatum, 309; carnosum, 296; cauda-felis, 295; caulescens, 303; characters of subgenera and species of, 290, 293; ciliatum, 307, 314; ciliolatum, 294; contortum, 299; Cooperi, *Baker*, *n. sp.*, 304; croceum, 297; Dregeanum, 299; drimiopsis, 301; eccremorhizum, 306; fasciculatum, *Baker*, *n. sp.*, 316; falcatum, 311; flavescens, 318; flexifolium, 307; floribundum, 296; Gerrardi, 313; glaucum, 306; gracile, 295; gramineum, 302; Grantii, 303; hirsutum, 313; hispidum, 310; Hookerii, 296; humile, 300; involucratum, 311; Jacquinianum, 308, and var.

Page

affinis, *Baker*, 308; leptophyllum, 317; Liliago, 301; longepedunculatum, 308; longifolium, 312, and var. Burchellii, 312; longistylum, *Baker, n. sp.*, 305; Macgowani, *Baker, n. sp.*, 309; muricatum, 313; nanum, *Baker, n. sp.*, 305, and var. rude, *Baker*, 306; nidulans, 314; nubicum, 301; nutans, 294; ornithogaloides, 294; pachyphyllum, *Baker, n. sp.*, 304; paradoxum, 314; peronatum, 294; pubescens, 309; pubirachis, 302; pudicum, *Baker, n. sp.* 308; pulchellum, 316; ramosum, 300; revolutum, 311; rigidum, 303; Rossii, 296; Saltii, *Baker, n. sp.*, 309; scabrellum, 318; scabrum, 310; Schultesii, 315; scilliflorum, 298; setosum, 295; Skinneri, *Baker, n. sp.*, 318; sphacelatum, 303; stenocarpum, *Baker, n. sp.*, 317; subpetiolatum, 302; thyrsoideum, 313; Torreyi, 317; triflorum, 315, and var. minor, *Baker*, 315; triquetrum, 293, & var. trinervis, *Baker*, 294; undulatum, 304; vestitum, *Baker, n. sp.*, 307; viscosum, 316; zanguebaricum, 302; Zeyheri, 298.

Anthoceros laevis 65

Anthogonium gracile 120

Antrophyum Boryanum, 421; plantagineum 111

Ants' food, F. Darwin on . . . 398

Apalodium australe 70

Apocynaceæ 143

Apteranthus, comment on (footnote) 249

Apterous flies of Kerguelen, Mr. H. N. Moseley on 54

Araceæ of Darjeeling 120

Araliaceæ, species of 151

Archer, W., on Kerguelen freshwater Algæ 445

Arcyria cinerea, 393; punicea, 393.

Ariscema costatum, 120; erubescens, 120; speciosum, J. Gammie on, 25; tortuosum, 120.

Arocladium politum (Hypnum) . 195

Arrangement parts of the flower, Dr. Masters on 456

Artemsia indica 148

Arthronia dendritella, *Nyl., n. sp.*, 443; phylloica, *Nyl., n. sp.*, 443.

Page

Arthropodium, *R. Br.* 315

—— candidum, 352; cirrhatum, 334; minus, 353; neo-caledonicum, *Baker, n. sp.*, 352; paniculatum, 352; pendulum, 353; Preissii, 353.

Arthrosolen glaucescens, *Oliv., n. sp.* 96

Artocarpus, sp.? in Admiralty Islands 80

Artocreas, *Berk. & Broome*=Michenera, *B. & Curtis* 83

Aru Islands, Algæ of 241

Aschersonia cubensis, 394; oxyspora, 394.

Asclepiadacea (Raphionacme?) from Tanganyika region . . . 91

Ascobolus cervinus, *Berk. & Broome, n. sp.* 85

Ascomycetes 364

Asparagopsis Sandfordiana . . . 448

Asparagus asiaticus, 92; Pauli-Gulielmi, 92; racemosus, 92.

Asperococcus bullosus, 453; echinatus, 452; sinuosus, 198, 453.

Asphodeleæ 258

Asphodeline, *Reich.* 273

—— ambigua, 276; Balanse, 277; brevicaulis, 276; characters of species of Asphodeline, 273; damascene, *Baker, n. sp.*, 276; globifera, 274; isthmocarpa, 278; liburnica, 275; lutea, 274; parviflora, *Baker, n. sp.*, 276; prolifera, 278; prismatocarpa, 277; rigidifolia, 277; taurica, 274; tenuior, 275.

Asphodelus, *Linn.* 268

—— acaulis, 271; albus, a subspecies of A. ramosus, 270; cerasiferus, subsp. of A. ramosus, 270; characters of species of Asphodelus, 269; fistulosus, and var. clavatus, 271; microcarpus, subsp. of A. ramosus, 270; pendulinus, and var. tenuifolius, 272; ramosus, 269; viscidulus, and var. micranthus, 272.

Aspidium aculeatum, 155, 426, and var. rufobarbatum, 155; aristatum, 155; auriculatum, and vars. ocellatum and subbipinnatum, 155; caducum, 155; fœniculaceum, 155; repandum, 107; Richardi, 426.

Asplenium aculeatum, 417; affine, 416; Andersoni, *C. B. Clarke*, and var. *a*, *β*, 154 (=Filix-Fœmina, by *Baker*); anisophyllum, 416; arborescens, 417; auritum,

Page

416; brachypteron, 416; Brackenbridgei, 107; bulbiferum, 425; capense, 417; Colensoi, 426; cuneatum, 107; decussatum, 107; dilatatum, 155; dimidiatum, var., 416; esculentum, 107; falcatum, 107, 417; flabellifolium, 425; flaccidum, 426; furcatum, 416; heterocarpum, 153; hirtum, 416; Hookerianum, 425; laciniatum, 153; laserpitiifolium, 107; lunulatum, 416; macrocarpum and var. Atkinsoni, 153; madagascariense, *Baker, n. sp.*, 417; Mannii, 416; nemorale, *Baker, n.sp.*, 417; nidus, 76, 78, 106, 416, and var. pachyphyllum, 106; nigripes, 154, 417; normale, 153; obtusatum, 107, and var. lucidum, 425; planicaule, 153; polypodioides and var. α, β, 155; Poolii, *Baker, n. sp.*, 416; protensum, 416; repandum, 107; resectum, 153, 416; Richardi, 426; Sandersoni, 416; serra, 416; sorzogonense, 154; sylvaticum, 417; tenuifolium, 153; Thunbergii, 417; tingens, 153; Trichomanes, 416; umbrosum, 154; unnamed species (nov.?), *C. B. Clarke*, from Darjeeling, 155.

Asterilla hemisphærica 65

Asterina melastomatis 397

Asteromphalus Wyville-Thomsonianus, *n. gen. and sp.* of marine diatom, *O'Meara* 57

Asterosphærium, *Reinsch, gen. nov.* (Protococcacearum) 213

—— elegans, *Reinsch, n. sp.* . . 213

Astilbe rivularis 142

Auricularia lobata 390

Australian flora with reference to classification of monocotyledons, G. Bentham on 490

Bahia, fungi of 49

Baker, J. G., on Anthericeæ and Eriospermeæ, 253; on Mr. Pool's coll. of ferns from Madagascar, 411; Polynesian ferns of 'Challenger' expedition, 104.

Balanophora dioica 122

Balantiopsis incrassata, *Mitt. n. sp.* 197

Balfour, I. B., coll. of Rodriguez lichens, 431; on flora of Rodriguez, in letter to Dr. Hooker, 24; on new genus of Turneraceæ from Rodriguez, 159.

Ballia callitricha, 43, 46, 202.

Banda Islands, Algæ of 240

Page

Barleria limnogeton, *Spencer Moore, n. sp.* 95

Barringtonia racemosa, Polynesia and Seychelles, 28; speciosa, 28; sp? of Admiralty Island, 75.

Bartramia, appressa, 194; australis, 194; capillata, *Mitt. n. sp.* 62; dumosa, 70; inconspicua, *Mitt., n.sp.*, 62; patens, 67, 194; pendula, 67, 194; quadrata, 70; radicosa, *Mitt. n. sp.*, 62; remotifolia, 70; robusta, 67, 73, 195; tenuis, 70.

Batrachospermum munitissimum, *Reinsch, n. sp.* 220

Bauhinia Riedellii 98

Beetles of Kerguelen, Mr. Moseley on 54

Begonia gemmipara, 131; Josephi 131

Begoniaceæ of Darjeeling . 131, 132

Belt, Mr., on nectar-glands of Acacia and ants' residence 398

Bentham, G., notes on the gamopetalous orders belonging to the Campanulaceous and Oleaceous groups, 1; distribution of Monocotyledons in primary groups and terminology, 490.

Berberidaceæ 134

Berberis aristata 134

Berkeley, the Rev. M. J., fungi of 'Challenger' exped. (2nd notice), 48; on fungi of Brazil (*vide* Cooke & Berkeley), 363; on fungi of Kerguelen (Venus Trans. exped.), 221; supp. fungi of Ceylon (Broome & Berkeley), 82.

Bermuda, Fungi of, 4; mosses of, 60.

Betel-nut of Admiralty Islands . 81

Betula, sp.? (Darjeeling) 126

Biddulphia aurita, 453; pulchella, 453.

Bidens pilosa 148

Bixineæ, Turneraceæ, a tribe of, I. B. Balfour, remarks on . . . 162

Blechnum orientale 106

Blindia curviseta, 193; microcarpa, *Mitt. n. sp.*, 65.

Boëa Commersonii, *R. Br.*, note on, H. Trimen 163

—— magellanica, 163; multiflora (foot-note), 163; Wallichii (foot-note), 163.

Bœhmeria cuspidata, 124; Hamiltoniana, 125; polystachya, 125.

platyphylla, 125; scabrella, 124.

Boenninghausenia albiflora . . . 135

Boraginaceæ of Darjeeling . . . 144

Page
Botanic notes from Darjeeling to Tonglo, by C. B. Clarke . . . 116
Bothryocarpa prolifera 245
Bothryoglossum platycarpum . . 47
Botrychium virginianum . . . 159
Bottinæa, *Colla* 333
— thysanotoides 334
Boucerosia compared with Decabelone 249
Brake fern, its nectar-glands . . 407
Brassaiopsis 151
Brassicaceæ of Darjeeling . . . 132
Brazil, Fungi of, Berkeley & Cooke on 363
Broome, C. E., & the Rev. M. J. Berkeley, suppl. to Fungi of Ceylon 82
Brunonia included in order Goodenoviceæ and characterized by indusium 2, 3
Brunoniaceæ, remarks on, by G. Bentham 1
Bryopsis cæspitosa, 42; plumosa, 203, 488.
Bryum albicans, 67, 195; crudum, 67, 195; dichotomum, 60; Eatoni, *Mitt. n. sp.*, 195; longatum, 195; julaceum, 63; kerguelense, *Mitt. n. sp.*, 67; lævigatum, 70; megalacrion, 63; nutans, 67, 195; pendulum, 67, 70, 195; truncorum, 63, 65.
Bucklandia populnea 152
Bulbine, *Linn.* 341
— alooides, 348; annua, 346; asphodeloides, 345; bisulcata, 346; bulbosa, 345; caulescens, 343; characters of subgenera and species of, 342, 343; densiflora, *Baker, n. sp.*, 347; dubia, 349; favosa, 343; filifolia, *Baker, n. sp.*, 344; latifolia, 349; laxiflora, *Baker, n. sp.*, 347; longiscapa, 344; mesembryanthemoides, 348; minima, *Baker, n. sp.*, 344; narcissifolia, 347; nutans, 348; pugioniformis, 346: præmorsa, 346; rostrata, 343; semibarbata, 349; urgineoides, *Baker, n. sp.*, 348; Zeyheri, 347.
Bulbinella, *Kunth*, subgenus of Anthericum 293
Bull's-horn Thorn, hollow spines of, as ants' nests 398
Burmanniaceæ 493
Byssacei 166

Cæsalpineacea, sp., from Tanganyika region (allied to the "Kobbo" of Schwein). 91

Page
Cæsia, *R. Br.* 357
— africana, 361; anthocladia, 360; characters, subgenera, and species of, 357; chlorantha, 359; corymbosa, *R. Br.*, and var. versicolor, *Lind.*, 360, 361; dichotoma, 360; lateriflora, 360; occidentalis, 358; paradoxa, 361; parviflora, 358; scabra, 359; setifera, *Baker, n. sp.*, 359; spiralis, 359; vittata, 358.
Caladium esculentum 80
Calamintha umbrosa 144
Callicarpa pentandra? 98
Callithamnion gracile, 41; Ptilota, 204; Rothii, 203; simile, 202.
Callitriche in pools, Darjeeling . 125
Callophyllis dichotoma, 43; elongata, *Dickie, n. sp.*, 47; tenera, 202; variegata, 46, 201.
Callopisma capense 171
Calophyllum inophyllum, Admiralty Islands, Polynesia, and Seychelles, 28, 75; several species of, in Mauritius, 28.
Calothrix olivacea 47
Calypogeia trichomanis 60
Cameron, Lieut. V. L., plants collected by him around Tanganyika 90
Campanula colorata 147
Campanulaceæ and allies, G. Bentham on, 1; geographical distribution of, 8; of Darjeeling, 147; structural peculiarities, &c., of, 5.
Campanuleæ, development and primitive stock, 11; geographical distribution of, 11, 12.
Campnosperma zeylanicum in S. India and Seychelles 27
Campylodiscus magnus, *Reinsch, n. sp.* 205
Campylopus appressifolius, 66; arcuatus, 61; cavifolius, 70; introflexus, 61, 70.
Canavalia obtusifolia in New Guinea 29
Cantharellus brasiliensis, 369; cibarius, 369; pusio, 369.
Cape lichens, the Rev. J. M. Crombie on 165
Capea elongata 451
Capparidaceæ absent in Darjeeling 132
Caprifoliaceæ 150
Caralluma, its corona simplex? 249; subulata, 250.
Carex, nature of the utricle, &c., G. Bentham on 509

Page

Carex foliosa, 119; fusiformis, 119; indica, 119.

Carlemannia congesta 149

Carpesium abrotanoides, 148; cernuum, 148.

Caryophylleæ of Darjeeling . . . 137

Cassia, species from Tanganyika region 91

Castonopsis tribuloides 125

Casuarina equisetifolia 76

Caulerpa Boryana, 236, 237; clavifera, 239, 242, 244; cupressoides, 449; cylindraceæ, 32, 449; distichophylla, 237; filiformis, 41; macrodiscus, 32; peltata, 244; plumaris, 242, 245, 449; sedoides, 237; simpliciuscula, 449; Urvilleana, 32; verticillata, 449.

Causes of superposition in flower, Dr. M. T. Masters on 462

Cecropia peltata, its food-bodies . 404

Celastrus stylosa 143

Celebes, North, plants of . . . 97

Cenangium brasiliense 398

Cenarrhenes, glands of 3

Centroceras clavatum, 42; cryptacanthum, 455, 487; micranthum, 236.

Centrolepidæ, inflorescence with respect to terminology, G. Bentham on 504

Cephalandra species? from Tanganyika region 91

Cephalozia connivens 61

Ceramiaceæ, 40, 41, 42, 43, 46, 202, 236, 450, 455, 487.

Ceramium capense, 42; involuta, 487; purpureus, 61, 66; rubrum, 202, 450, 452.

Ceratodon purpureus . . . 73, 194

Ceratopteris thalictroides . . . 106

Ceratum hydroideum 394

Cerbera Odollam, *Gært.*, var. obtusifolia 30

Cetraria aculeata, var. acanthella, *Arch.*, 227; epiphorella, 227.

Cetrariei 227

Ceylon, supplement to Fungi . . 82

Chætangium ornatum, 41; variolosum, 45, 201.

Chætoceros borealis, 55; peruvianus, 55.

Chætomorpha æra, 453; crassa, 451; inflata, 236; linum, 487; pacifica, 455; tortuosa, 453; valida, 242.

'Challenger' expedition, see contributions to the botany of.

Page

Chamabainia squamigera 125

Chamæscilla, *F. Muel.*, subgen. of Cæsia 358

Champia compressa 244

Championia multiflora, *C. B. Clarke*, not Boëa multiflora (foot-note) 163

Characters used by authors in classification of Monocotyledons. . 490

Cheilanthes tenuifolia 106

Cheilosporum sagittum 448

Chestnut of Tonglo = Quercus Andersoni 125

Chiloscyphus lucidus, *Mitt. n. sp.* 64

Chiodecton cerebriforme 233

Chirita, Kurzii (Didymocarpus), 145; macrophylla, 145; urticæfolia, 145.

Chlamydococcus, sp. *Reinsch* . . 214

Chlamysporum (*Salisb.*) a subgen. of Thysanotus, *R. Br.* 334

Chloopsis caulescens (= Ophiopogon spicatus, auct.) abounds in Darjeeling 121

Chlorea poeppiggii 227

Chlorodesmis comosa, 236, 241; vaucheriæformis, 488.

Chlorogaleæ 258

Chlorophyton macrophyllum . . 92

Chlorophytum, *Ker* 321

—— acaule, 327; affine, 327; Afzelii, *Baker, n. sp.*, 323; alismæfolium, *Baker, n. sp.*, 324; alpinum, 328; amplexicaule, *Baker, n. sp.*, 325; arundinaceum, *Baker, n. sp.*, 323; attenuatum, 332; blepharophyllum, 327; Bowkerii, 332; breviscapum, 323; Burchellii, *Baker, n. sp.*, 330; characters of species of Chlorophytum, 321, 322; comosum, 329; crispum, 331; elatum, 330; glaucum, 324; Heynii, 322; inornatum, 324; juncifolium, *Baker, n. sp.*, 333; laxiflorum, 328; longifolium, 327; macrophyllum, 323; macrosporum, 330; malabaricum, *Baker, n. sp.*, 331; modestum, *Baker, n. sp.*, 329; orchidastrum, 325; nepalense, 330; petiolatum, 326; pubiflorum, *Baker, n. sp.*, 329; Schidospermum, 326; sparsiflorum, *Baker, n. sp.*, 325; stenopetalum, *Baker, n. sp.*, 331; tetraphyllum, 328; Tinneæ, *Baker, n. sp.*, 333; tuberosum, 332; vestitum, *Baker, n. sp.*, 326.

Page
Chlorosplenium brasiliense . . . 397
Chorda filum 449
Chordaria flagelliformis, 450; hippuriodes, 452.
Chordariaceæ, 44, 198, 449, 452, 487, 488.
Choreoclonium, *Reinsch*, *n. gen.* (Chætophorearum) 217
—— procumbens, *Reinsch*, *n. sp.* . 217
Chorisis and Enation, Dr. Masters on 466
Chroolepus aureum 43
Chrysobactron, *Hook. f.*, a subgen. of Anthericum 295
Chrysymenia uvaria . . . 245, 448
Chytridium pyriforme, *Reinsch*, *n. sp.* 215
Cienkowskia? species from Tanganyika region 92
Cinnamomum obtusifolium . . . 139
Cladhymenia conferta, 42; pellucida, *Dickie*, *n. sp.*, 42.
Cladia aggregata 166, 225
Cladina rangiferina, 235; sylvatica (*L.*), and its var. pycnoclada, *Pers.* 225.
Cladoderris dendritica 387
Cladonia acuminata, 182; Balfouri, *Crombie*, *n. sp.*, 433; carneola, 224; cornucopioides, *f.* insignis, *Nyl.*, 225; costata, 224; fimbriata, 166, 182, 224, and its var. costata, 182; furcata, *Hffm.*, 166, and var. grandescens, *Nyl.*, 224; gracilis, var. tripoda, *Crombie*, 224; Lamarckii, 224; melanodes, *Nyl.*, *n. sp.*, 225; percrassata, *Nyl.*, *n. sp.*, 225; racemosa, 224; sphærulifera, 225; squamosa, 224; subcornuta, 166; subsquamosa, var. nudior, *Nyl.*, 224.
Cladoniei 166, 182, 224, 433
Cladophora arcta, 47, 203; coarcta, *Dickie*, *n. sp.*, 451; flexuosa, 203; incerta, *Dickie*, *n. sp.*, 454; mauritiana, 236, 244; patentiramea, 455; pellucida, 33; rupestris, 47; simpliciuscula, 203; Wrightiana, 451.
Cladosporium herbarium 394
Clarke, C. B., on Edgaria a n. gen. of Cucurbitaceæ from Sikkim. 113; botanic notes from Darjeeling to Tonglo, 116.
Classification and terminology in Monocotyledons, by G. Bentham 490
Clausonia, subgen. of Asphodelus, *L.* 269

Page
Clavaria cirrhata, 390; connata, 391; cornea, 391; crispula, 391; dealbata, 391; delicia, 390; fusco-lilacina, 391; panurensis, 391; rubra, 391; scabra, 391; Sprucei, 391; subulata, 391; verpiformis, 391.
Clematis Buchananiana, 133; Kirkii, 90; montana? 133.
Cleone hirta 90
Clerodendron Riedelii, *Oliv.*, *n. sp.* 100
Climacosphænia moniligera . . . 453
Coccocarpia molybdæ 436
Cocconeis pacifica, 57; regalis, 57; scutellum, 57, 453.
Cocoanut palms of Admiralty Islands, H. N. Moseley's remarks on 79
Codium adhærens, 203, 243; difforme, 488; spongiosum, 237; tomentosum, 33, 46, 236, 237, 240, 243, 449, 453.
Codonopsis inflata, bursting of anthers, J. Gammie on, 26; of Darjeeling, 147.
Cœlogyne præcox (=C. Wallichii, *Hook.*, Sikkim) frequent in Darjeeling 121
Coix lachryma, seeds of, as ornaments with Admiralty Islanders 81
Collecting-hairs in Lobelieæ, remarks on 4
Collema pulposum, var. tenax, 166; sp.? from Rodriguez, 432.
Collemacei . . . 166, 181, 223, 433
Collemei 181, 223, 432
Colouring matters of the red Algæ, H. C. Sorby on 34
Colquhounia, nov. sp., Darjeeling . 145
Commelyna cœlestis (=C. erecta, *L.*, ex *Asa Gray*), a common weed at Darjeeling, 121; obliqua, 121; two species from the Tanganyika region, 92.
Commelynaceæ, how associated, &c., 498; of Darjeeling, C. B. Clarke on, 121.
Compositæ 147
Confervaceæ, 33, 43, 46, 203, 236, 237, 240, 242, 244, 253, 454, 455, 487.
Coniferæ rare in Darjeeling . . . 122
Coniomycetes 364
Contents, &c., of flowering glume . 516
Contributions to the botany of the 'Challenger' expedition, Algæ, 40, 41, 42, 43, 47, 235, 445, 446, 486; diatoms, 55; ferns, 104; flowering plants &c., 53, 73, 481;

Page
fungi, 48 ; mosses and liverworts, 59 ; orchids, 83.
Convolvulus, species from Tanganyika region (Breweria malvacea? *Kl.*) 91
Conyza ægyptiaca 91
Cooke, M. C., and the Rev. M. J. Berkeley, on the fungi of Brazil 363
Copal tree, Trachylobium Hornemannianum, identified with that which yielded the gum "animi," Dr. J. Kirk on 234
Coprinus atramentarius (foot-note), 222 ; consobrinus, 368 ; matutinus, 369 , tomentosus, 53 ; torquatus, 368.
Cora pavonia 51
Corallina Berteri, 452, 487 ; subulata, 452.
Corallinaceæ, 32, 45, 200, 236, 239, 240, 242, 243, 244, 448, 450, 452, 487, 488.
Corallopsis autralasica, 239, 448 ; Urvillea, 448.
Cordia subcordata (Polynesia and Seychelles) 28
Cordierites Sprucei 397
Cordyline terminalis, *Kth.*, var. infundibularis, *Baker*, differs from the var. sepiaria. 30
Coronariæ group of Monocotyledons (taken in Endlicher's sense), Mr. G. Bentham on 494
Cortinarius Weddelianus 369
Corydalis chærophylla, 134 ; sibirica, 134.
Corynotheca, a subgenus of Cæsia 357
Coscinodiscus centralis, 57 ; concavus, 57 ; fimbriatus, 57 ; Moseleyi, *O'Meara, n. sp.*, 57 ; radiatus, 57 ; radiolatus, 57 ; subtilis, 57.
Courbonia decumbens 90
Couthovia, sp.? from N. Celebes . 98
Craniotome versicolor 145
Crassulaceæ 132
Craterellus rugiceps, *Berk. & Cooke, n. sp.* 387
Craterium leucostictum 393
Crawfurdia luteo-viridis 143
Crombie, the Rev. J. M., on the lichens of :—Cape of Good Hope coll. by the Rev. A. E. Eaton, 165 ; Falklands, Fuegia, Patagonia, &c., coll. by Prof. Cunningham, 222 ; Kerguelen, coll. by the Rev. A. E. Eaton, 180 ; Madagascar, coll. by W. Pool, 409 ; Rodriguez, coll. by I. B. Balfour, 431.

Page
Crotalaria laburnifolia 90
Cryptonemaceæ, 40, 41, 43, 46, 48, 201, 245, 246, 448, 452, 454, 455, 487.
Cucurbitaceæ of Darjeeling . . . 126
Cunningham, Prof. R. O., Lichens coll. by him, during voyage of H.M.S. 'Nassau' 222
Curdiea obtusa 448
Cyanotis barbata of Darjeeling . . 121
Cyathea appendiculata, *Baker, n. sp.*, 411 ; arachnoidea, 104 ; discolor, *Baker, n. sp.*, 412 ; Moseleyi, *Baker, n. sp.*, 104 ; quadrata, *Baker, n. sp.*, 411.
Cyatheaceæ of New Zealand . . . 423
Cyathus limbatus, 393 ; microporus, 393 ; Montagnei, 393 ; plicatus, 393.
Cycad of Admiralty Islands . . . 79
Cycloderma Weddellii 392
Cyclonema spinescens, *Oliv., n. sp.* 96
Cycnium adonense? 92
Cynodontium australe, 65, 70 ; conicum, 61, 193 ; Hookeri, 193.
Cynoglossum furcatum 144
Cyperaceæ, glumal arrangement of, &c., 506 ; peculiarities of bracteolate genera of, 511 ; setae on scales of, 510.
Cyperaceæ of Darjeeling, C. B. Clarke's remarks on 119
Cyperus coloratus, 92 ; rotundus, 92 ; vulgaris, 119.
Cyphella perpusilla, *Berk., n. sp.* 51
Cyphieæ as included in Lobeliæ, remarks on, by Mr. G. Bentham 11
Cyphocarpus, what allied to . . . 6
Cyrtandraceæ 145
Cyrtosia Lindleyana 120
Cystoclonium purpurascens, colouring matter of 38
Cystophora elongata, *Dickie, n. sp.* 241
Cystophyllum Swartzii. 449
Cystopteris fragilis, 424 ; setosa, 152.
Cystoseira spicigera 540

Dactylis glomerata 119
Dædalia quercina, 385 ; sanguinea, 385 ; Sprucei, 385.
Daltonia of Tristan D'Acunha . . 63
Daphne papyracea, 139 ; Wallichii, 139
Daphnidium elongatum 139
Darjeeling to Tonglo, botanic notes on 116
Darwin, Francis, on Glandular Bodies and Nectar-glands of Acacia, Cecropia, and Pteris . . . 398

Page

Dasya Berkleyi 42, 45, 199

Dasycladeæ 236, 237, 243

Davallia elegans, 106, 413; ferruginea, 413; flabellifolia, *Baker, n. sp.*, 414; Goudotiana, 414; heterophylla, *Sw.*, var. nervosa, 105; Hookeri, 152; nodosa, 152; polypodioides, 106; pteropus, 152; pulchella, 106; pulchra, 152; repens, 106; solida, *Sw.*, var. Lindleyi, *Hook.*, 106, and var. ornata, *Wall.*, 106; speluncæ, 106; tenuifolia, 413; thecifera, 413.

Decabelone Barklyi, 249; elegans, 249.

Delesseria crassinervia, 200; Davisii, 45, 200; Lyallii, 43, 45, 200; quercifolia, 200.

Delisea pulchra 45, 48

Dendrasphodeline, subgen. Asphodeline, *Reich.* 274

Dendrobium nitidissimum, *Reich., n. sp.*, 112; ophioglossum, *Reich., n. sp.*, 113; trichostomum, *Reich. fil. MSS.*, 30.

—— type of new section = Diplocaulobium 112

Depazea Mappa 397

Description of staminal pistillody in an acanthad 89

—— of a sport in Paritium tricuspe, by G. King 101

Desmarestia aculeata, 44; chordalis, 44, 198; media, 44, 198, Rossii, 44, 47, 198; viridis, 42, 44, 198.

Desmia ambigua, 239.

Desmidieæ of Kerguelen 446

Diatoma grande, 55; rhombicum, *O'Meara, n. sp.*, 55.

Diatomaceæ of the 'Challenger' exped., &c. 55, 453

Dicalpe aspidioides 152

Dicentra thalictriflora 134

Dichopogon, 318; humulis, 319; strictus, 319.

Dichopogon, subgen. of Arthropodium 352

Dichroa febrifuga 142

Dichrocephala latifolia 147

Dichrostachys nutans 91

Dickie, Prof. G., on Algæ of Island of Mangaia, S. Pacific, 30; on Algæ of 'Challenger' exped., 40, 41, 42, 43, 47, 235, 446, 485; on Algæ of Kerguelen, 'Venus-transit' exped., 198.

Dicksonia Henriettæ, 413, scabra, 152.

Page

Dicranum antarticum, 79; kerguelense, 193; pungens, var. luciidum, 66; tortifolium, 66, 194.

Dictidium ambiguum 83

Dictyonema tridens, 447; sonderi, 447.

Dictyonema membranaceum, 390; sericeum, 390.

Dictyosphæria favulosa . . 244, 449

Dictyota dichotoma, 238, 241, 243; Kunthii, 451; lata, 244, 447; nævosa, 452; radicans, 236; spinulosa, 453.

Dictyotaceæ, 31, 198, 235, 236, 238, 241, 242, 243, 244, 255, 447, 449, 450, 452, 453, 455.

Diderma depressum 83

Didymium farinaceum, 393; microcarpon, *Fr.*, var. xanthopus, *Ditm.* = D. farinaceum, 83; reticulatum, *Berk. & Broome, n. sp.*, 83; squamulosum, 83.

Didymocarpus subalternans, 145; villosa, 145.

Didymochlæna lunulata 417

Digestion? in Nepenthes . . . 427

Dilanthes, *Baker*, a subgen. of Anthericum 314

Dilleniaceæ 133

Diplasia, peculiarities of structure, 512; pycnostachya, *Benth., n. sp.*, 512.

Diplocaulobium, a new section of the genus Dendrobium, Prof. Reichenbach on 112

Diplophyllum acutifolium . . . 69

Distichophyllum fasciculatum, *Mitt., n. sp.*, 70; imbricatum, *Mitt., n. sp.*, 71.

Distribution of monocotyledons into primary groups 490

Dittelasma rarak, in Malay islands and Seychelles 28

Dobinea vulgaris 132

Doliochos? sp. from Tanganyika region 91

Dombeya spectabilis 90

Dorydium, subgenus Asphodeline, *Reich.* 273

Dothidea granulosa, 396; Myrciæ, 396; rhytismoides, 86.

Downingia, G. Bentham observ. on 8

Draparnaldia pulchella, 486; subtilis, *Reinsch, n. sp.*, 218.

Drosera dichotoma and rotundifolia, experiments on digestive secretion of 427

Dumortiera hirsuta 61

Page
D'Urvillea Harveyi, 44,198 ; utilis, 43, 198, 482.
Dyer, W. T. Thiselton, note to Mr. King's account of sport in Paritium tricuspe, 103 ; on the genus Hoodia, with a diagnosis of a new species, 248 ; on the plant yielding Latakia tobacco, 246.

Eaton, the Rev. A. E., his collections made during Venus-transit exped., 165, 180, 193, 198, 205, 221.
Eccremis coarctata 320
Echeandia terniflora 288
Ectocarpaceæ, 31, 44, 199, 238, 450, 454.
Ectocarpus cæspitalis, 454 ; geminatus, 44, 199 ; siliculosus, 450 ; sordidus, 238.
Edgaria, *nov. gen.*, Cucurbitaceæ, C. B. Clarke on 113, 130
—— darjeelingensis, *n. sp.* 114
Elachista flaccida 199
Elæocarpus lanceæfolius 132
Elatostema dissectum, 124 ; diversifolium, 124 ; Hookerianum, 124 ; Mariannæ, *C. B. Clarke, n. sp.*, 124 ; nigrescens, 124 ; obtusum, 124 ; sessile, 124 ; sikkimense, *C. B. Clarke, n. sp.*, 124 ; subincisum, 124.
Elsholtzia flava, 144 ; strobilifera, 144.
Embelia floribunda 144
Enantioblastæ of Endl. unnatural . 495
Enation and Chorisis, Dr. Masters on 466
Endocalyx, *Berk. & Broome, n. gen.* 84
—— psilostoma, *B. & Br.* 85
—— Thwaitesii, *B. & Br.* 84
Endocarpon hepaticum 180
Endocena, *Crombie, nov. gen* . . . 226
—— informis, *Cromb.* 226
Enteromorpha compressa, 46, 203, 242, 454, 487 ; var. trichodes, *Ktz.*, 455 ; intestinalis, 453.
Entosthodon laxus, 70, 194 ; Templetoni, 59.
Enumeration, fungi of 'Challenger' exped. 48
——, lichens Cape of Good Hope, "Venus-transit" exped. . . . 165
——, —— Rodriguez, "Venus-transit" exped. 431
——, —— Kerguelen "Venus-transit" exped. 180

Page
Enumeration, plants coll. by Lieut. Cameron (Tanganyika) . . . 90
Epigynæ 492
Epilobium roseum 149
Epymenia obtusa, 43 ; variolosa, 202.
Eragrostis Chapelieri, 92 ; poæoides, 92 ; sp. doubtful (Tanganyika), 92.
Erblichia, 160 ; comparison with Mathurina, 161.
Eremurus, *M. Bieb.* 278
—— altaicus, 280 ; angustifolius, 282 ; anisopterus, 284 ; Aucherianus, 282; var.? Buhsei, *Baker*, 283 ; aurantiacus, *Baker, n. sp.*, 285 ; cappadocicus, *J. Gay, MSS.* (=Asphodelus glaucus, *Aucher-Eloy*), 281 ; characters, species of, 279 ; Griffithii, *Baker, n. sp.*, 283 ; himalaicus, *Baker, n. sp.*, 283 ; inderiensis, 281 ; Kaufmanni, 282 ; Olgæ, 282 ; persicus, 284 ; robustus, 284 ; spectabilis, 280 ; stenophyllus, *Baker, n. sp.*, 281 ; Stocksii, *Baker, n. sp.*, 283 ; tauricus, 280 ; turkestanicus, 281.
Eremurus verus, a subgenus . . 279
Ericaceæ of Darjeeling 135
Eriocauleæ, structural peculiarities flower of 503
Erioderma polycarpus 231
Eriosema rhynchosioides, *Baker, n. sp.* 94
Eriospermeæ, J. B. Baker on Revision of genera and species of, 253, 258
Eriospermum, *Jacq.* 262
—— abyssinicum, *Baker, n. sp.*, 265 ; albucoides, *Baker, n. sp.*, 263 ; Bellendeni, 265 ; Bowieanum, *Baker, n. sp.*, 267 ; brevipes, *Baker, n. sp.*, 263; calcaratum, *Baker, n. sp.*, 264 ; characters of species of, 262 ; Cooperi, *Baker, n. sp.*, 265 ; corymbosum, *Baker, n. sp.*, 266 ; folioliferum, *Andr.*, 268 ; Kirkii, *Baker, n. sp.*, 267 ; lanceæfolium, 264 ; lanuginosum, 263 ; latifolium, 265 ; Mackenii, 266 ; ornithogaloides, *Baker, n. sp.*, 266 ; paradoxum, 267 ; parvifolium, 264 ; proliferum, *Baker*, (=L. folioliferum, *Gawl.*), 267 ; pubescens, 263 ; spirale, 266.
Erythrina tomentosa 91
Erythroclonium Sonderi 448
Euanthericeæ 259

Page

Euarthropodium, subgen. of Arthropodium, *B. Br* 352
Eubulbine, subgen. of Bulbine, *L.* 342
Eucæsia, subgen. of Cæsia, *R. Br.* 357
Euchema spinosum 448
Eucladium verticillatum 60
Eulalia nepalensis 119
Euphorbiaceæ sparse in Darjeeling, 125; Phyllanthus, sp., doubtful from Tanganyika region, 92.
Eupleuria pulchella 57
Eurya japonica 133
Eustichia longirostris 63
Eustypandra, a subgen. of Stypandra 355
Experiments on digestive ferments of Nepenthes and Drosera . . 429
—— on grass land by manuring . 19
Extract of Letter to Dr. Hooker, by J. Horne, on Flora of Seychelles 27

Fagopyrum, sp. 138
Fairy Rings, note on, J. H. Gilbert 17
Falkland Islands, lichens of . . . 222
False superposition, Dr. M. Masters on 457
Families of Algæ from Kerguelen, coll. by Ven.-Trans. exp., summary of, by Prof. Dickie . . . 204
—— —— ——, freshwater, by P. F. Reinsch 205
Families where superposition of flower most frequent 457
Favolus alutacens, 386; brasiliensis, 50, 386; multiplex, 386; Sprucei, 386; tessulatus, 386.
Ferns, of Madagascar, 411; Polynesian, 104; Rakaia River, Canterbury, N. Z., 423.
Ficus, three species yielding india-rubber in Sikkim, J. Gammie on, 26; sp.? of, in Admiralty Islands, Mr. Moseley's remarks on, 79.
Fiji Islands, Algæ of 242
Fimbriaria africana 60
Fissidens asplenoides 63
Fistulina rosea 387
Flora of Marion Island, Notes on, by H. N. Moseley, 481; of Rodriguez, I. B. Balfour on, 24; of Seychelles, J. Horne on, 27.
Floral formulæ, adopted by Dr. Max. Masters 456
Flüggea intermedia. 121
"Food-bodies" of Acacia, Cecropia, and Pteris, F. Darwin on . 398

Page

Forstera, *Endl.*=Phyllachne, *F. Muell.* 2
—— and Phyllachne distinguished by Swartz 2
Fossombronia australis, *Mitt.*, *n. sp.* 73
Fragaria vesca 142
Fragillaria æqualis, 55; capucina, 55; crotonensis, 55; virescens, 55.
Fraxineæ, structure and distribution of 15
Frerea 249
Fucaceæ, 31, 41, 43, 47, 198, 238, 240, 241, 242, 243, 244, 245, 447, 450, 453, 455.
Fucus leptophyllus 450
Fugeia, lichens of 222
Fuirena pubescens 92
Fumariaceæ numerous at Tonglo . 134
Fungi of Bahia, 49; Bermuda, 48; Brazil, 363; Ceylon, 82; Kerguelen, 53, 221; Marion Island, 52; Tristan D'Acunha, 52.
Further notes on the plants of Kerguelen, with some remarks on the insects, by H. N. Moseley 53

Galaxaura annulata, 32; lapidescens, 32, 454; marginata, 240; rugosa, 242; spongiosa, 454.
Gallium hirtifolium, sp.? . . . 149
Gamon, *Gay*, a subgen. of Asphodelus, *L.* 269
Gasteromycetes 364
Geaster fimbriatus, 393; saccatus, 393.
Gelidiaceæ, 32, 41, 44, 201, 236, 239, 243, 244, 448, 451, 488.
Gelidium Amansii, 451; rigidum, 32, 236, 239, 243, 244.
Gentiana pedicellata 143
Geoglossum hirsutum 49
Geographical distribution of Anthericeæ and Eriospermeæ . . . 257
Gephyria Dyerana, *O'Meara*, *n. sp.* 59
Geraniaceæ of Tonglo 136
Geranium nepalense, 136; polyanthes, 136.
Gigartina Burmani, 40; contorta, 452; radula, 202.
Gilbert, J. H., on "Fairy Rings" 17
Gill, the Rev. W. W., coll. of Algæ from Island of Mangaia, S. Pacific 30
Ginnania furcellata 541
Girardinia heterophylla 123

Page
Gladiolus, sp., near G. natalensis? from Tanganyika region . . . 92
Glandular bodies of Acacia and Cecropia 398
—— disk of flower, homology of . 3
Gleichenia dichotoma (from Ternate), 104; longissima, 152.
Gleoporus conchoides 386
Glœothece involuta, *Reinsch*, *n. sp.* 206
Gloriosa virescens, *Lind.* and var.. 92
Glumales, limits according to Bentham, and confusion arising from terms 502
Glumes, definition of, by G. Bentham 502
Glycerina tonglensis, *C. B. Clarke*, *n. sp.* 119
Glyphis cicatricosa, var. favulosa, 444; tricosula, *Nyl.*, *n. sp.*, 444.
Gnaphalium confusum 148
Gongosira pachyderma, *Reinsch*, *n. sp.* 218
Gomphonema bicapitatum, *O'Meara*, *n. sp.*, 55; calcareum, 55; intricatum, 55, tenellum, 55.
Goodenovieæ, *R. Br.*, criticism on, by G. Bentham 2
Gossypium barbadense 90
Gottschea carnosa, *Mitt.*, *n. sp.* . 72
Gracilaria confervoides, 451; confervoides, var. capillans, *Ktz.*? 239; corniculata, 239; coronopifolia, 451; dactyloides, 239, 245; eucheumoides, 240, 243; furcellata, 448; ramalina, 448.
Gramineæ of Darjeeling and Tonglo, 119; typical glumal arrangement, but terminology unsettled, 513.
Grammatophora marina, 57, 453; maxima, 57; serpentina, 57.
Grammothele polygramma . . . 387
Graphidei 179, 233, 443
Graphis analoga, 444, assimilis, 444; scalpturata, 444.
Grateloupia filiformis, 455; versicolor, 487.
Griffithsia antartica, 487.
Grimmia apocarpa, 194; chlorocarpa, 66, 70, 194; insularis, *Mitt.*, *n. sp.*, 73; lanuginosa, 70, 194; membranacea, *Mitt.*, *n. sp.*, 61.
Guepinia dilatata, 390; fissa, 390; spathularia, 390.
Gum Copal, identity of the, yielding the subfossil gums, Dr. J. Kirk on 234

Page
Gutenbergia polycephala, *Oliv. & Hiern.* (ined.) 95
Gymnogongrus dilatatus . . . 246
Gynogramme argentea, 421, var. aurea, 421; aurita, 158; javanica, 159, 420; opaca, 158; lanceolata, 421; microphylla, 159.
Gymnomitrium atricapillum . . 69
Gynura angulosa 148
Gyrophorei 171

Habenaria pectinata, 120; sp. from Tanganyika region, 92; ternatea, *Reichb.*, *n. sp.*, 112.
Habitat of Boëa Commersonii, H. Trimen on 164
Habits of filices, Malvern Hills, Gorge, Rakaia river, Canterbury, N. Z., by T. H. Potts 423
Hæmanthus, sp.? 92
Halimeda cuneata, 449; incrassata, 449; incrassata, var. monilis, 488; macroloba, 33, 237, 239, 242, 243, 449; opuntia, 33, 236, 239, 242, 243, 245, 454; parvifolium, 243; tridens, 236; triloba, 239; tuna, 244, 488.
Halymenia floresia, 448; latissima, 202.
Heard island, cryptogamic botany of 73
Hedychium, aff. H. angustifolio, *Roxb.*, from N. Guinea. . . . 30
Heliomyces Sprucei 369
Heliophytum indicum 91
Helminthocladieæ, 32, 240, 242, 244, 451, 454, 455.
Helwingia himalaica 151
Hemiarcyria Karsteni 84
Hemiaulus antarticus 55
Hemicarpha, bracteoles of, &c.. . 508
Hemitelia Melleri, 412; Smithii, 423.
Henningia, subgen. of Eremurus . 279
Hepaticæ of 'Challenger' exped., W. Mitten on, 59, and of Venus-trans. exped. 193
Heppia Rodriguesii, *Cromb.*, *n. sp.* 436
Heptapleurum tomentosum, sp.? . 151
Heracleum nepalense, 150; obtusifolium, 150.
Heritiera littoralis, Polynesia and Seychelles 28
Herminium (? congestum) . . . 120
Herpetospermum pedunculosum, allied to Edgaria 115
Herpocladium fissum, *Mitt.*, *n. sp.*, 69
Herpolirion, *Hook. fil.* 287
—— novæ zealandiæ 287

Page

Hesperanthes, *Baker*, a subgen. of Anthericum 317

Hexagonia coriacea, *B. Cooke*, *n. sp.*, 386; erubescens, 386; gracilis, 386; leprodes, 386; variegata, 386.

Hibiscus cannabinus, 90; rosa-sinensis, African wild form of, 478; it fruits in Barbadoes and Scotland, by Prof. Oliver, 480; rosa-sinensis, use of, by Admiralty islanders, 82; (Paritium) tricuspis, questionably a local form derived from H. (P.) tilaceus, 103.

Hirneola auriformis, 392; coffeicolor, *Berk.*, *n. sp.*, 49; eximia, *B. & Cooke*, *n. sp.*, 392; hispidula, 392; polytricha, 392; protracta, 392; rufa, 51.

Hodgsoniola, F. Muel. 289

—— junciformis, F. Muel. . . . 289

Holbœllia latifolia 134

Holcus lanatus 119

Holophyllum, *Hook*=Phyllachne, *Swartz* 2

Holopodium, *Baker*, a subgen. of Anthericum 299

Homalium 162

Homology and development of food-bodies of Acacia, 401; of Cecropia, 406.

Homology of parts of flower of Monocotyledons 502

Hoodia, genus of, with diagnosis of new species, W. T. Thiselton Dyer on, 248; characters emended, 251; Barklyi, *Dyer*, *n. sp.*, 252; Currori, 251; Gordoni, 252.

Hormophysa articulata 241

Hormosiphon coriaceus, var. Kerguelenensis, 210; leptosiphon, *Reinsch*, *n. sp.*, 210.

Hydnophytum, *sp. nov.*, *Oliv.*, from Admiralty Islands, note on, by Mr. Moseley 76

Hydnum dissitum, *B. & Cooke*, *n. sp.*, 387; flavum, 387.

Hydrangea robusta, 142; vestita, 142.

Hydrocharidæ, removed from Alismaceæ by G. Bentham . . . 492

Hydroclathrus cancellatus . 241, 450

Hydrocoleum Eatoni, *Reinsch*, *n. sp.* 207

Hydrocotyle nepalense 150

Hygrophorus brasiliensis, 369; nitens, 369; prasinus, 369; siparius, 369.

Page

Hymenochæte damæcornis, 389; reniforme, 389.

Hymenomycetes of Cuba and Brazil compared 36

Hymenophyllaceæ of New Zealand 423

Hymenophyllum ciliatum, 413; demissum, 423; exsertum, 152; javanicum, 423; multifidum, 423; polyanthos, 92, 152, 413, 423; polyodon, *Baker*, *n. sp.*, 105; Poolii, *Baker*, *n. sp.*, 413; Simonsianum, 152; sp. from Admiralty Islands, 76; tunbridgense, 423.

Hymenopogon parasiticus . . . 149

Hypericaceæ of Darjeeling . . . 133

Hypericum Hookeranium, 133; napaulense, 133; patulum, 133.

Hyphomycetes 364

Hypnea cervicornis, 488; divaricata, 236, 239; hamulosa, 236; rugulosa, 32; spinella, 244.

Hypnum Bonplandi, 63; illecebrum, 59; paradoxum, 196; raphidorhynchum, 63; salebrosum, 196; subpilosum, 68, 72.

Hypochnus albocinctus, 390; nigrocinctus, 390; rubrocinctus, 390.

Hypoëstes, sp.? from Tanganyika region 92

Hypolepis anthriscifolia, 414; millefolia, 424; tenuifolia, 106, 424.

Hypolyssus Montagnei 390

Hypolytrum bracteoles of, &c. . . 508

Hypoperdon crucibulum 393

Hypoxis of Darjeeling 120

Hypoxylon clavus, 396; cœnopus, 396; concentricum, 49; conopus, 52; Leprieurii, 396; micropus, 396; Moselei, *Berk.*, *n. sp.*, 52; obovatum, 396; placentæforme, 52; turbinatum, *Berk.*, *n. sp.*, 51; Wrightii, 396.

Identification of the modern copal tree, Trachylobium Hornemannianum, with that yielding the subfossil gum copal, by Dr. J. Kirk 234

Ilicineæ 143

Ilex dipyrena ?, 143; insignis, 143.

Imbauba tree, food-bodies of . . 404

Impatiens arguta, 136; longipes, 137; puberula, 136; racemosa, 137; radiata, 137; sp.? allied to radiata, 137; spirifer, 136; stenantha, 137.

Page

India-rubber of Sikkim, remarks on, by J. Gammie . . . . . . , 26

Indigofera Cameroni, *Baker*, *n. sp.*, 93; cuneata, *Baker*, *n. sp.*, 92; dissitiflora, *Baker*, *n. sp.*, 93; hirsuta, 91; torulosa, 91.

Indusium, nature of, &c. . . . 3, 4

Inflorescence of Eriospermeæ and Antheraceæ 255

Insects of Kerguelen and their relation to the vegetation, Mr. Moseley on 54

Ipomœa, sp., allied to I. simplex, from Tanganyika region . . . 91

Iridæa capensis, 41, 46; indefinite boundaries of, 493; laminarioides, 46, 487.

Iridiaceæ of Darjeeling 120

Irpex Sprucei 387

Isaria glauca 85

Isopterygium tenerum 61

Isotoma, slight obliquity of corolla 5

Jania rubens, 239; tenella, 236, 242, 488.

Jasmineæ, characters of, &c. . . 15

Jasminum auriculatum, var. β, zanzibarense? (I. tetense, *Kl.*) from Tanganyika region 91

Juglans regia 126

Juncaceæ of Darjeeling, 121; remarks by G. Bentham on Juncaceæ, 498.

Juncus Bufonius, 121; castaneus, 121; concinnus, 121.

Jungermannia colorata, 63, 68, 72; cylindriformis, *Mitt.*, *n. sp.*, 196; leucorhiza, *Mitt.*, *n. sp.*, 68.

Jussiæa villosa? var. 91

Kalanchoe platysepala 91

Kallymenia cribrosa, 451; dentata, *Suhr.*, var. α and γ, 46, 202.

Kerguelen's Land, diatoms from 55, 57; Eaton's coll. of Algæ from, by Prof. Dickie, 198; freshwater Algæ, 205, 445; fungi of, 53, 221; insects, their relation to vegetation, 54; lichens of, 180; musci and hepaticæ of, 65, 193; plants generally of, 53.

Killinga, its spikelet, &c. . . . 506

King, G., on sport in Paritium tricuspe, *G. Don.* 101

Kirk, Dr. J., identification of recent and subfossil copal trees, 234; note on specimens of Hibiscus allied to H. rosa-sinensis from E.-trop. Africa, 478.

Page

Kraussia congesta, *Oliv.*, *n. sp.* . 95

Kunthian terminology objected to by G. Bentham 513

Labiatæ 144

Lachocladium brasiliense, 388; furcellatum, 388; reticulatum, 388; tubulosum, 388.

Lagerstrœmia Riedeliana, *Oliv.*, *sp.n.* 99

Laminaria japonica 450

Laminariaceæ, 42, 44, 47, 198, 450, 451, 487.

Lantana, sp.? from Tanganyika region and near L. salviæfolia . 92

Laportea evittata 123

Laschia reticulatum, 390: tremellosa, 390.

Lasianthus (Mephitida) sp. . . . 149

Latakia tobacco 246

Laurels of the Tonglo 139

Laurencia concinna, 245; filiformis, 237, 447; Forsteri, 238; Grevilleana, *Harv.*? 448; obtusa, 31, 235, 238, 447, 488, var. gracilis, 31; papillosa, 238, 244; papillosa, *Forsk.*, var. thyrsoides, 488; virgata, 41.

Laurenciaceæ, 31, 41, 42, 44, 200, 235, 237, 238, 244, 245, 447, 488.

Lawes and Gilbert's experiments on pasturage by manure 19

Laws of Terminology 514

Leaves of Anthericeæ and Eriospermeæ 255

Lecanora achroa, *Nyl.*, *n. sp.*, 439; achroella, *Nyl.*, *n. sp.*, 439; antrorimata *Nyl.*, *n. sp.*, 174; apostatica, *Nyl.*, *n. sp.*, 437; atra, f. succedanea, *Nyl.*, 440; atrocæsia, *Nyl.*, *n. sp.*, 185; aurantiaca, and var. isidiosella, 437; auriantiaca, erythrella, *Ach.*, 172; aurantiella, *Nyl.*, *n. sp.*, 437; broccha, *Nyl.*, *n. sp.*, 185; carneofusca, *Nyl.*, *n. sp.*, 438; cinnabarina, *Ach.*, 171, 437, and var. perminiata, *Nyl.*, 171; cinnabariza, 172; confragulosa, *Nyl.*, *n. sp.*, 172; conizæa, 440; conizopta, *Nyl.*, *n. sp.*, 440; diffusilis, *Nyl.*, *n. sp.*, 174; diphyella, *Nyl. n. sp.*, 184; elæophæa, *Nyl.*, *n. sp.*, 173; elegans, *Ach.*, 184, and f. lucens, *Nyl.*, 184; endochrysodes, *Nyl.*, *n. sp.*, 232; galactinella, *Nyl.*, Crombie, remarks on, 173; galactiniza, *Nyl.*, *n. sp.*, 173; gelida, 232, and f. terricola, 232; glaucofuscula,

Page

Nyl., *n. sp.*, & var. biatoroidea, 437; glauco-livescens, *Nyl.*, *n.sp.*, 173; holochracea, 171; leucoxantha, 437; macrophthalma, 185; murorum, 171; murorum, var. lobulata (*Smrf.*), 436; obliquans, 438; parella, phlœoleuca, *Nyl.*, 440; perlutescens, *Nyl.*, *n. sp.*, 439; præmicans, *Nyl.*, *n. sp.*, 172; psaromela, *Nyl.*, *n. sp.*, 174; punicea, 232, 440; pyracea, f. picta (Tayl.), *Nyl.*, 172; pyropœcila, *Nyl.*, *n. sp.*, 172; smaragdula, 174; subflavicans, *Nyl.*, *n. sp.*, 438; subfusca, f. pumicicola, *Nyl.*, 438; sublutescens, 188; subunicolor, *Nyl.*, *n. sp.*, 172, 184; umbrina, 185; vitellinella, 184; xanthophana, 174.

Lecanorei . . . 171, 183, 231, 436.

Lecidea achroopholis, *Nyl.*, *n. sp.*, 441; amylacea, 188; asbolodes, *Nyl.*, *n. sp.*, 188; assentiens, *Nyl.*, *n. sp.*, 137; assimilata, 187; bumamma, *Nyl.*, *n. sp.*, 177; cerebrinella, 191; chalybeia, 178; chlorophæata, *Nyl.*, *n. sp.*, 176; chloropoliza, 178; coccocarpioides, *Nyl.*, *n. sp.*, 441; configurans, *Nyl.*, *n. sp.*, 442; continens, *Nyl.*, *n. sp.*, 442; contingens, *Nyl.*, *n. sp.*, 178; disciformis, 442; distrata, *Nyl.*, *n. sp.*, 179; Eatoni, *Cromb.*, *n.sp.*, 189; geographica, 179, 191; granulosula, *Nyl.*, *n. sp.*, 177; halonia, 178: immutans, *Nyl.*, *n. sp.*, 442; incuriosa, *Nyl.*, *n. sp.*, 178; intersita, *Nyl.*, *n. sp.*, 187; leucoxantha, 177; lygomma, *Nyl.*, *n. sp.*, 189; meiospora, 177; melopta, *Nyl.*, *n. sp.*, 441; minutula, 179; myriocarpa (*D. C.*), *Nyl.*, & f. erumpens, 190; myriocarpa, f. marcidula, *Nyl.*, *n. sp.* ?, 179; obumbrata, *Nyl.*, *n. sp.*, 177; parasema, var. elæochroma, *Ach.*, 177; perusta, *Nyl.*, *n. sp.*, 188; phæostoma, *Nyl.*, *n. sp.*, 87; sincerula, f. Dicksonii (*Ach.*), 190; spadicomma, *Nyl.*, *n. sp.*, 233; spuria, 178, 442; subalbicans, *Nyl.*, *n. sp.*, 176; subascentiens, *Nyl.*, *n. sp.*, 188; subcontinua, *Nyl.* *n. sp.*, 189; subplana, *Nyl.*, *n. sp.*, 189; subplicata, *Nyl.*, *n. sp.*, 190; subtristis, *Nyl.*, *n. sp.*, 179; terrena, 177; triphragmia, 442; tristiuscula, *Nyl.*, *n. sp.*, 190; variatula, *Nyl.*, *n. sp.*, 186.

Lecidiei 176, 187, 233, 441

Leguminosæ 140

Leioscyphus pallens, *Mitt.*, *n. sp.*, 68, 196; turgescens, 196.

Lejeunia, parasitica 64

Lemanea fluviatilis, colouring-matter of 39

Lembidium ventrosum, *Mitt.*, *n. sp.* 69, 197

Lentinus albidus, 373; calvescens, 373; compressus, *B. & Cooke*, *n. sp.*, 373; conchatus, 374; crassipes, 373; crinitus, 372; fulvaster, *B. & Cooke*, *n. sp.*, 373; fumigatus, 372; furcatus, *B. & Cooke*, *n. sp.*, 372; Guilleminianus, 374; leucochrous, 374; Nicotiana, 373; pygmæus, *Berk.*, *n. sp.*, 50; Schombergii, 373; Schwartzii, 372; submembranaceus, 374; subtilis, *Berk.*, *n. sp.*, 50; tener, 372; tricholoma, *B. & Cooke*, *n. sp.*, 374; velutinus, 373; villosus, 50, 372.

Lenzites applanata, 374; brasiliensis, 374; deplanata, 374; striata, 375.

Leontis nepetæfolia 91

Lepidozia lævifolia, 73; procumbens, 64.

Lepraria latebrarum 234

Leptactinia heinsioides, *Hiern*, *sp. nov. ined.* 91

Leptinella, remarks of Mr. H. N. Moseley on that of Kerguelen . 54

Leptogium phyllocarpum, 166, 223; tremelloides, 166, 433.

Leptothrix hyalina, *Reinsch*, *n. sp.*, 206; symplocoides, *Dickie*, *n. sp.*, 240.

Leschenaultia, indusium of . . . 5

Lessonia fuscescens, 44; nigrescens, 47; ovata, 47.

Lethocolea prostrata, *Mitt.*, *n. sp.* 64

Letter to Dr. Hooker from Balfour, I. B., on flora of Rodriguez . . 24

—— —— Gammie on Ariscema speciosum, &c. 25

Letter to Dr. Hooker from Horne, J., on flora of Seychelles . . . 27

Leveillea Schimperi 447

Leycesteria formosa 150

Liagora australasica, 32; viscida, 32, 448.

Page

Licea cinnabarina, *Berk. & Broome*, *n. sp.* 84
Lichenacei 166
Lichenes Capenses, the Rev. J. M. Crombie on 165
—— Insulæ Rodriguesii. By the Rev. J. M. Crombie 431
—— Terræ Kergueleni, the Rev. J. M. Crombie on 180
Lichens, Falklands, Fuegian, Patagonia, and Chiloe Is., the Rev. J. M. Crombie on 222
—— of Madagascar 409
Lichina antarctica, *Cromb.*, *n. sp.* 181
Lichinei 181
Liliaceæ of Darjeeling, C. B. Clarke on 121
——, Remarks on, by G. Bentham 495
——, Tribes Eriospermeæ and Anthericeæ, J. G. Baker on 253
Limosella of Kerguelen, Mr. H. N. Moseley on 531
Linaceæ 136
Lindenbergia urticæfolia 147
Lindsaya cultrata, 152; lobata, 106.
Lipocarpha, glume of 509
Lissochilus, sp.? 92
List of the Musci and Hepaticæ collected in Kerguelen's Island by the Rev. A. E. Eaton. By W. Mitten 193
—— of Plants collected in New Guinea by Dr. A. B. Meyer, Prof. Oliver on 29
—— of plants, Darjeeling to Tonglo. By C. B. Clarke 119
Lithothamnion byssoides, 489; Darwini, 32; imbricatum, *Dickie*, *n. sp.*, 436, 486; mammillare, 488; polymorphum, 450, 455.
Litsæa foliosa? 139
Lobelia Bergiana, *Cham.* (Grammatotheca *Presl & DC.*, with Clintonia, *Dougl.* = Downingia), peculiar structure of, commented on by G. Bentham, 7; Wallichiana, 147.
Lobelieæ, G. Bentham on 6
—— Delpino's, genealogical tables criticised 9
Lomaria alpina, 425; attenuata, *Willd.* var., heterophylla, 415; biformis, *Baker*, *n. sp.*, 415; Boryana, 415; duplicata, *Potts*, *n. sp.?* 425; lanceolata, 425; of Kerguelen, H. N. Moseley's remarks on, 53; Patersoni, 425; pluviatilis, 425; procera, 106, 415, 424; pubescens, *Baker*, *n. sp.*, 415; punctulata, 415; pycnophylla, 153; vulcacanica, 425.
Lonchitus madagascarica, 414; polybius, *Baker*, *n. sp.*, 414.
Lonicera glabrata 150
Lophocolea inconspicua, *Mitt.*, *n. sp.*, 64; novæ-zealandiæ, 72, 196; pallide-virens, 72, 197; serrata, 64.
Loranthaceæ, 99, 152.
Loranthus stenopetalus, *Oliv.*, *n. sp.* 99
Lycogala epidendron 51, 393
Lycoperdon Astrocaryi, *B. & Cooke*, *n. sp.* 393
Lycopodium cernuum, 111; clavatum, 139; complanatum, 422; dichotomum (N. Celebes), 98; pecten, *Baker*, *n. sp.*, 421.
Lygodium dichotomum, 111; reticulatum, 111; lanceolatum, 421; sp? of Admiralty Islands, 76.
Lyngbya ferruginea, 489; major, *Kutz.*, var. kerguelensis, 206; majuscula, 245, 489; tropica, 33.
Lyonsia celebica, *Oliv.*, *n. sp.* 99
Lysimachia debilis, 144; evalvis, 144; ramosa, 144.
Lysionotus terniflora 145

Macrocystis angustifolia, 42; latifolia, 487; pyrifera, 42, 44, 198, 487.
Macromitrum acutirameum, *Mitt.*, *n. sp.* 62
Madagascar, ferns of, 411; flora of, compared with that of Seychelles, by J. Horne, 28.
Magnolia Campbellii 133
Magnoliaceæ of Darjeeling 133
Mallotus oreophilus 125
Malvaceæ absent in Darjeeling 132
Mangaia Island, Algæ from 30
Manure, how affecting vegetation, J. H. Gilbert on 18
Marasmius aleurites, *B. & Cooke*, *n. sp.*, 371; atrorubens, 370; bellus, 371; bermudensis, *Berk.*, *n. sp.*, 49; brasiliensis, 371; caatingensis, 370; cladophyllus, 371; coilobasis, 371; cupressiformis, 371; decurrens, 370; dilatatus, 371; epileucus, 371; ferrugineus, 370; flammans, 370; fulviceps, 370; fulvus, *Mont. MS.*, 370; hædinus, 369; hæmatocephalus, 370; helvolus, 370;

Page

hippiochætes, 371; hirtellus, 370; ignobilis, 371; inoderma, 371; leoninus, 369; luteus, 372; mitiusculus, 370; nivosus, 371; obscurus, 371; omphalodes, 371; plectophyllus, 369; pœcilus, 370; polygrammus, 370; populiformis, 371; pulchellus, 371; rhabarbarinus, 369; rubicosus, 370; rufopunctatus, 372; rufo-striatulus, 372; sabali, *Berk.*, *n. sp.*, 49; semisparsus, *Berk.*, *n. sp.*, 50; spaniophyllus, 372; tageticolor, 370; traganus, *B. & Cooke*, *n. sp.*, 372; Wedellianus, 372.

Marattia fraxinea, 421, and var. Smithii, 111.

Marchantia polymorpha . 65, 70, 197

Marine diatoms from surface of water between Kerguelen and Heard Island 56

Marion Island, cryptogamic flora of, 52, 55, 70; Notes on Botany of, by H. N. Moseley, 481.

Marsupidium excisum, *Mitt.*, *n. sp.* 69, 197

Masters, Dr. Maxwell T., on superposed arrangement of the parts of the flower 456

Mastigothrix articulata, *Reinsch*, *n. sp.*, 207; minuta, *Reinsch*, *n. sp.*, 207.

Mastophora Lamourouxii, 239, 448, 489

Mathurina, *I. B. Balfour* . . . 159

—— penduliflora, *I. B. Balf.*, *n.sp.*, 160; compared with Erblichia &c., 161; connects Turneraceæ with Samydaceæ, 162.

Mauritius, its flora compared with Seychelles, by J. Horne . . . 28

Mazus dentatus, 146; surculosus, 146.

Meconopsis robusta 134

Melastomaceæ 149

Meliaceæ 136

Meliola amphitricha, 397; penicillata, 397.

Meliosma (? pinnata, *Planch.*) . . 136

Melissa parviflora 145

Melobesia antarctica, 200; calcarea, 487; foliacea, 244; kerguelena, *Dickie*, *n. sp.*, 200; lichenoides, 200; nummuloides, 453; pustulata, 32; verrucata, 45, 239, 242, 448, 452.

Melosira moniliformis, 55; subflexilis, 57.

Page

Memorialis hirta 125

Menispermaceæ absent in Darjeeling 126

Metanarthecium, *Maxim.* . . . 285

—— luteo-viride 286

Methods employed in examination of structure of food-bodies of Acacia, &c., by F. Darwin . . 400

Meyer, Dr. A. B., plants collected by, in New Guinea 29

Michelia excelsa 133

Michenera, *B. & Curtis*, = Artocreas, *B. & Broome* 83

Microdictyon Agardhianum, 237, 454; Montagnei, 33.

Micropeltes applanata, 397; marginata, 397.

Microstylis Wallichi 120

Microthamnion cladophoroides, *Reinsch*, *n. sp.*, 216; Kuetzingianum, 446.

Mielichhoferia campylocarpa, 68, 195; tenuiseta, 70.

Mimulus nepalense 146

Minute structure of food-bodies of Acacia and Cecropia . . 400, 405

Mitten, W., on Musci and Hepaticæ of the 'Challenger' expedition, 59; and of Venus-transit expedition, 193.

Mnium rostratum, 59; undulatum, 59.

Monocotyledonous orders, their grouping, by G. Bentham . . 491

Monothylaceum, *Don* 248

Moore, S. Le Marchant, on staminal pistillody in an Acanthad 86

Morgagnia Bubani, 354; bicolor, 354.

Moseley, H. N., on Flora of Marion Island, 481; notes on plants and insects of Kerguelen, 53; remarks on plants of Admiralty Islands, 73.

Muehlenbergia sylvatica 119

Musci and Hepaticæ, 'Challenger' expedition, by W. Mitten, 59; Bermuda, 60; Heard Island, 73; Inaccessible Island, 65; Kerguelen, 193; Marion Island, 70; Tristan d'Acunha, 61; Venus-transit expedition, 193.

Mycogone sphærophora 394

Myriactis nepalense, 147; Wallichii, 147.

Myrothecium atrocarneum, *Berk. & Broome*, *n. sp.* 85

Myrsinaceæ 144

Page
Narthecium, 350; americanum, 351; asiaticum, 350; californicum, 351; ossifragum, 350.
'Nassau,' H.M.S., Voyage of, and lichens collected during . . . 222
Nasturtium montanum 132
Navicula carussius, 55; viridis, 55.
Nectar-glands of Pteris aquilina, 407; of Acacia sphærocephala, 404.
Nectria coccinea, 394; episphærica, 394; gyrosa, *Berk. & Broome, n. sp.*, 86.
Neillia thyrsifolia 140
Nelsonia tomentosa, *Willd.* . . . 92
Nematella corticola 392
Neomeris dumetosa 236
Nepenthes celebica 98
—— digestive ferment of . 427, 428
Nephrodium albopunctatum, 418; apiciflorum, 155; Boivini, 418; Boryanum, and var. β, microstegioides, 157; calopteron, 418; fibrillosum, *Baker, n. sp.*, 418; Filix-Mas, 158, 418, and var. elongatum, 156, 418; and var. maderensis, 418, flaccidum, 157; gracilescens ?, 155; hirtipes, 157; invisum, 107; latifolium and var. irregulare, 108; microchlamys, *Baker, n. sp.*, 107; molle, 107, 418; nidus, 156; parallelum, *Baker, n. sp.*, 417; patentissimum, 156; pennigerum, 107, and var., sp. ? allied to, 418; prolixum, 155; pulvinuliferum, 157; Sewellii, *Baker, n. sp.*, 418; splendens, 157; truncatum, 108; unitum, 418.
Nephrolepis acuta, 108, 419, var. rufescens, 108; exaltata, 108; ramosa, 108.
Nephroma analogicum, *Nyl., n. sp.*, 231; antarcticum, 231; plumbeum, 231.
Nerine sp. ? 92
Neuropogon melaxanthus, 182, 227, f. sorediifer, *Cromb.*, 182, 227, var ciliata, *Nyl.*, 182; Taylori, 182.
Neurymenia fraxinifolia . . 245, 447
Neutral flower, signification of . . 515
New Guinea, plants of, collected by Dr. A. B. Meyer, Prof. Oliver on, 29; marine algæ obtained near, 241.
New Zealand, habits of ferns of, T. H. Potts on 423
Nicotiana rustica, yields the Turkish tobacco, 246; N. tabaccum distinct from N. rustica, 246; var. fruticosa, 246.
Niphobolus, sp. ? of Admiralty Islands 76
Nitella Hookeri, *Reinsch, n. sp.*, 219; of Kerguelen Land, Mr. H. N. Moseley on, 53.
Nitophyllum fusco-rubrum, 45, 200; laciniatum, 201; lividum, 201; multinerve, 45; undulatum, 40.
Nitzschia grandiformis 57
Normandina pulchella 180
North-Celebes plants, Prof. Oliver on Mr. Riedel's collection of . . 97
Nostoc hydrocoleoides, *Reinsch, n. sp.*, 208; leptonema, *Reinsch, n. sp.*, 209, var. crystallophorum, 209; paludosum, 486; polysaccum, *Reinsch, n. sp.*, 208; polysporum, *Reinsch, n. sp.* 208.
Note on a coll. of N. Celebes plants made by Mr. Riedel, of Gorontalo, Prof. Oliver on 97
—— on a sport in Paritium tricuspe, by G. King 101
—— on Boëa Commersonii, by H. Trimen 163
—— on freshwater algæ collected by Mr. Moseley in Kerguelen, by W. Archer 445
—— on species of Hibiscus allied to H. rosa-sinensis collected in Trop. Africa, by Dr. Kirk, with remarks by Prof. Oliver . 478
—— on the occurrence of "Fairy Rings," by J. H. Gilbert . . . 17
Notes on algæ from island of Mangaia, S. Pacific, Prof. Dickie on . 30
—— on algæ collected by H. N. Moseley, chiefly in Torres Straits, Japan, and Juan Fernandez, by Prof. Dickie 446
—— on the flora of Marion Island by H. N. Moseley 481
—— on plants collected and observed at Admiralty Islands, by H. N. Moseley 73
—— on the gamopetalous orders belonging to the Campanulaceous and Oleaceous groups, by G. Bentham 1
Notes on the Rev. A. E. Eaton's collection of algæ from Kerguelen by Prof. Dickie 198
Notochæte hamosa 145
Nudifloræ, what included under, and structure 500

Page

Nutmegs, wild, sown by pigeons, remarks on 77

Objects of the diversities in mode of arrangement of flower, Dr. Masters on 471
Occurrence of staminal pistillody in an Acanthad, by L. Le Marchant Moore 86
Ochna macrocalyx 90
Ocymum canum, var. ?, 91; sp. near O. obovatum, 91; sp. undetermined, from Tanganyika, 91.
Odontidium hyemale 57
Oil and protoplasm in food-bodies, 401, 402
Olacaceæ absent in Darjeeling, 135; relative position of perianth &c., 471.
Oldenlandia, sp., near O. parviflora, from Tanganyika 91
Olea, sp. ? of Tonglo 144
Oleaceæ and Salvadoraceæ, G. Bentham on 14
Oleaceous groups, G. Bentham . 1
Oleandra articulata, 419; Wallichii, 157.
Oleineæ, structure and distribution 16
Oliver, Prof. D., enumeration of plants collected by Lieut. Cameron around Tanganyika, 90; list of New-Guinea plants, 29; remarks on Dr. Kirk's species of Hibiscus from E. Africa, 479.
Olpidium caudatum, *Reinsch*, *n. sp.* 215
O'Meara, the Rev. E., on the diatoms of Kerguelen 55
On a collection of ferns made by Mr. Pool in Madagascar, by J. G. Baker 411
Onagraceæ 149
On a new genus of Turneraceæ from Rodriguez, by I. B. Balfour . . 159
On Edgaria, a new genus of Cucurbitaceæ, by C. B. Clarke . . . 113
On Lichens collected by Prof. Cunningham in Falklands, Fuegia, Patagonia, and Chiloe island during voyage of H.M.S. 'Nassau,' by the Rev. J. M. Crombie . . 222
On lichens collected by Mr. Pool in Madagascar, by the Rev. J. M. Crombie 409
On some Orchidaceæ collected by Mr. Moseley, 'Challenger' expedition, in Admiralty Islands, Ternate, and Cape York, one of which forms the type of a new section of the genus Dendrobium, by Prof. H. G. Reichenbach . . 112

Page

On the characteristic colouring-matters of the red groups of algæ, by H. C. Sorby 34
On the diatomaceous gatherings made at Kerguelen's Land by H. N. Moseley, of the 'Challenger,' by the Rev. E. O'Meara . 55
On the digestive ferment of Nepenthes, by S. H. Vines 427
On the distribution of the Monocotyledonous orders into primary groups, by G. Bentham . . . 490
On the genus Hoodia, with a diagnosis of a new species, by W. T. Thiselton Dyer 248
On the glandular bodies on Acacia sphærocephala and Cecropia peltata serving as food for ants, with an appendix on nectar-glands of Pteris aquilina, by F. Darwin 398
On the plant yielding Latakia Tobacco, by W. T. Thiselton Dyer 246
On the Polynesian ferns of the 'Challenger' expedition, by J. G. Baker 104
Opegrapha difficilior, *Nyl.*, *n. sp.*, 443; parvula, *Nyl.*, *n. sp.*, 179.
Ophelia chirata, 143; paniculata, 143.
Ophioglossum pendulum . . 76, 111
Ophiorrhiza rugosa ? and sp. ? . . 149
Ophiotheca bicolor, *Berk. & Broome*, *n. sp.*, 84; Wrightii, 84.
Orchideæ, a defined order of Monocotyledons, 493; of Admiralty Islands &c., 76, 112; of Sikkim, 120.
Orders of Monocotyledons, grouping of, by G. Bentham . . . 491
Orthocæsia, subgenus of Cæsia . . 358
Orthosira marina 57
Orthotrichum atratum, *Mitt.*, *n. sp.*, 66; crassifolium, 66, 194; rupestre, 194.
Osbeckia crinita 149
Oscillaria gracillima 489
Oscillariaceæ, 34, 47, 240, 245.
Oscillatoria nigra, soluble colouring-matter of, 35; spectral bands of (woodcut), 36.
Osmundeæ of New Zealand . . . 426
Otiona Aitonia 61

Padina Commersonii, 450; pavonia, 235, 238, 241, 243, 455.

Page

Paleæ, homologues of 516

Pallavicinius procumbens. 65

Palmæ not so high as Darjeeling . 119

Palmella cruenta, colouring-matter of 39

Palmistes of Rodriguez, P. bon and P. marron 25

Palms a natural group, G. Bentham, 499; scarce or absent in Sikkim, 120.

Panax pseudo-ginseng and sp.? . 151

Pandanus, species of, in Admiralty Islands 76, 79

Pannaria leucosticta, var. isidiopsis, *Nyl.*, 171; luridula, *Nyl.*, *n. sp.*, 436; obscurior, *Nyl.*, *n. sp.*, 183; pholidota, 231; placodiopsis, *Nyl.*, *n. sp.*, 183; rubiginosa, 171; rubiginosa, f. cinerascens, *Nyl.*, 436; and var. dispartita, *Nyl.*, 436; subcincinnata, *Nyl.*, *n. sp.*, 231.

Panus lineatus, 374; reticulatus, 374; Sprucei, 374; viscidus, 374.

Papaveraceæ of Tonglo 134

Paradisea, *Mazz.*, 286; liliastrum, *Bert.*, 286.

Paris polyphylla 122

Paritium tiliaceum, 103; tricuspe, sport in, remarks on, by G. King, 101.

Parmelia adhærens, *Nyl.*, *n. sp.*, 168; atrichoides, *Nyl.*, *n. sp.*, 167, 434; cincinnata, 228; conspersa, 167, and var. hypoclysta, *Nyl.*, 168; conspersula, *Nyl.*, *n. sp.*, 168; constrictans, 168, and var. eradicata, *Nyl.*, 168; Cunninghami, *Crombie*, *n. sp.*, 228; Delisella, *Nyl.*, *n. sp.*, 228; dispora, *Nyl.*, *n. sp.*, 228; endomiltodes, *Nyl.*, *n. sp.*, 168; fuliginosa, 169; hottentotta, 170; latissima, 434; lichinoidea, *Nyl.*, *n. sp.*, 169; lugubris, 228; molliuscula, 169; molybdiza, *Nyl.*, *n. sp.*, 167; perforata, 167; perlata, var. ciliata, *Schær.*, 410; peruviana, *Nyl.*, 228; prolixula, *Nyl.*, *n. sp.*, 169; revoluta, 228; squamariata, *Nyl.*, *n. sp.*, 168; stygiodes, *Nyl.*, *n. sp.*, 183; subæquans, 167; subconspersa, 168, 434.

Parmeliei, 167, 183, 228, 434.

Parmularia styracis 397

Pasithea cærulea 320

Patagonia, the lichens of 222

Page

Paxillus retiarius, 369; viridis, 369.

Pediastrum Boryanum, 446; ellipticum, 446.

Pedicularis gracilis 147

Pellæa calomelanos 414

Peltigera canina, 170; polydactyla, f. hymenina (*Ach.*), 183; rufescens, 231; rufescens, f. spuria (*DC.*), 183.

Peltigerei, 170, 183, 231.

Penicillus capitatus 489

Pentapanax, species of 151

Pentaphragma macrophylla, *Oliv.*, *sp. nov.* from New Guinea . . 29

Pentapyxis stipulata 149

Perianth and andrœcium in their relative position in Liliaceæ and Olacaceæ, 471; of Eriospermeæ and Anthericeæ, 255.

Perichæna marginata, *Berk.* & *Broome*, *n. sp.* 84

Perigonium, occasionally a misnomer 510

Perilla ocimoides 144

Perncarpa carnosa 147

Pernettya repens 135

Pertusaria amara, 174; chiodectinoides, 186; cineraria, *Nyl.*, *n. sp.*, 186; coccophora, 233; impalescens, *Nyl.*, *n. sp.*, 440; leioplaca, f. octospora, *Nyl.*, 175; perrimosa, 186, and f. subferruginosa, *Crombie*, 186; subdealbata, *Nyl.*, *n. sp.*, 175; velata, 440; vepallida, *Nyl.*, *n. sp.*, 175; Wawreanoides, *Nyl.*, *n. sp.*, 174.

Pertusariei . . . 174, 186, 233, 444

Peyssonnelia rubra . . . 245, 454

Peziza cinerea, 397; herpotricha, 397; Hindsii, 397; kerguelenensis, 53, 222; tricholoma, 397; vinosa, 397.

Phacidium dentatum 398

Phalangium, *Tonur*, a subgenus of Anthericum 300

Phaseolus, sp., from Tanganyika reg. 91

Philydraceæ, limits of, &c 497

Phycocyan, a colouring-matter of red Algæ 35, 38

Phycoerythrin, a colouring-principle of red Algæ 35, 38

Phyllachne and Forstera distinguished by Swartz 2

Phyllophora cuneifolia 201

Physarum didermoides, 83; lividum, *Rostaf.*, var. conglobatum, *Fr.*, 83; Mülleri, 83; nutans, 83.

Page

Physcia ægialita, 435; affixa, *Nyl., sp. n.*, 170; aureola, 170; chrysophthalma, 170; flammea, 170; flavicans, 170, 410; flavicans, f. crocea (*Ach.*), 435; leucomela angustifolia, *Mey. et Flot.*, 170, 410; minor, 170; parietina, 170; parietina, var. polycarpon, *Flk.*, 231, and var. ectanea, *Ach.*, 231; picta, 435; setosa, 170; speciosa, 231, 435; subpicta, 171.

Physciei 170, 231, 435

Physcomitrium brevisetum, *Mitt., n. sp.* 65

Piddingtonia nummularia . . . 147

Pigeons distributing seeds, Mr. Moseley's remarks on 77

Pilea anisophylla, 123; approximata, *C. B. Clarke, n. sp.*, 123; bracteosa, 123; oxyodon, 123; scripta, 123; smilacifolia, 123; symmeria, 123; ternifolia, 123; umbrosa, 123.

Pimpinella sp? 150

Piper pedicellatum 139

Piperaceæ 139

Pistil of Anthericeæ and Eriospermeæ 257

Pistillody, staminal, in an Acanthad, S. L'. M. Moore on . . . 86

Pittosporum floribundum . . . 135

Pixidicula radiata, *O'Meara, n. sp.* (marine) 58

Placopsis gelida, 184, and f. latentia, *Nyl.*, 184.

Plagiochila heterodonta, 68, 196; infuscata, *Mitt., n. sp.*, 63; marionensis, *Mitt., n. sp.*, 72.

Plagiothecium antarcticum . 71, 195

Plants of N. Celebes, Prof. Oliver on 97

Platycerium grande, 111; madagascariense, *Baker, n. sp.*, 421.

Platylepis, bracteoles of, &c. . . 508

Platysma glaucum, f. coralloidea (*Wallr.*), 228; ulophyllum, 228.

Plectocanthus striatus 144

Plectomia of Darjeeling 120

Pleiomery, Dr. Masters on . . . 469

Pleuroschisma prostrata . . . 61

Pleurospermum, sp.? of 150

Plocamium cornutum, 487; Hookeri, 45, 47, 201.

Plumbago amplexicaulis, *Oliv., n. sp.*, 96; zeylanica, 92.

Poa annua, 119; subsecunda, 119.

Page

Pogonatum aloides, 59; alpinum, 196.

Pollexfenia pedicellata 447

Pollinia, sp.? 119

Polycarpæa corymbosa 90

Polygala arillata 132

Polygalaceæ of Darjeeling . . . 132

Polygonaceæ of Darjeeling . . . 137

Polygonatum sibiricum 122

Polygonum capitatum, 137; chinense, 138; crispatum, 138; filicaule, 137; molle, 138; perforatum, 137; runcinatum, 138.

Polyphysa spicata 243

Polypodiaceæ of New Zealand . . 424

Polypodium adnascens, 108; amœnum, 157; auriculatum, 157; australe, 426; Billardierii, 426; bullatum, *Baker, n. sp.*, 420; decorum, 108; deltodon, *Baker, n. sp.*, 419; devolutum, *Baker, n. sp.*, 419; difforme, 108; distans, 157; ebenipes, and var. β, Oakesii, 158; fissum, 420; grammatidis, 426; Griffithianum, 158; heracleum, 110; himalayense, 157; iriodes, 420; juglandifolium, 158; lachnopus, 157; lanceolatum, 420; Lehmanni, 158; leiorhizon, 158; lineare and var. β. stenophyllum, 158, 420; linguæforme, 109; lycopodioides, 420; macropodium, *Baker, n. sp.*, 108; malacodon, 158; membranaceum, 158; microrhizoma, *C. B. Clarke, n. sp.*, 157; millisorum, *Baker, n. sp.*, 109; Moseleyi, *Baker, n. sp.*, 110; nigrescens, 110; normale, *Don*, 158, var. madagascariense, *Baker*, 420; pachydermum, *Baker, n. sp.*, 108; phlebiscopum, *Baker. n. sp.*, 110; phymatodes, 110, 420; Poolii, *Baker, n. sp.*, 419; punctatum, 426; quercifolium, 110; rampans, *Baker, n. sp.*, 109; rigescens, 419; selligmoides? from New Guinea, 30; serpens, 426; serratulum, 419; Stewartii, 158; subauriculatum, 157; subdigitatum, 157; subfalcatum, 157; subpinnatum, *Baker, n. sp.*; superficiale, 158; trifidum, 158; verrucosum, 108; Willdenovii, 420.

Polyporus aculeans, 383; albocervinus, 382; affinis, 379; apalus, 375; applanatus, 381;

Page

arcularius, 49; armeniacus, 380; atropurpureus, 379; atro-umbrinus, 381; Auberianus, 50, 381; augustus, 375; auriscalpium, 377; australis, 50, 381; bistratosus, *Berk. & Cooke, n. sp.*, 384; Blanchetianus, 377; brunneopictus, 378; calcigenus, 376; camerarius, 375; caperatus, 383; capucinus, 382; carneopallens, 384; carneus, 382; cassiæcolor, 375; cavernulosus, 384; chromaticus, *Berk. & Cooke, n. sp.*, 384; chrysitis, 382; corticola, 384; cryptacanthus, 384; cupreoroseus, 382; decolor, 379; deglubens, 384; detritus, 380; diabolicus, 376; Dietrichsenii, 379; dissitus, 83; endothrix, 380; evolvens, 384; exilis, 375; fasciatus, 381; ferreus, 382; flavescens, 382; floridanus, 382; gallinaceus, 379; grammocephalus, 377; guianensis, 375; hædinus, 383; Haskarlii, 382; hemibaphus, 379; heteromorphus, 375; hinnuleus, *Berk. & Cooke, n. sp.*, 378; hirsutus, 383; holosclerus, 383; hornodermus, 382; hypocitrinus, *Berk., n. sp.*, 50; hypoplastus, 376; igniarius, 381; infernalis, 377; inflexibilis, 381; intercalaris, *Berk. & Cooke, n. sp.*, 380; iodinus, 383; lentus, 375; Leprieurii, 377; lichnoides, 381; lucidus, 377; luteo-nitidus, 375; luteus, 378; macer, 378; marasmioides, 376; martius, 381; mutabilis, 378; myrrhinus, 382; nephridius, 379; nivosus, 380; oblectus, 375; obliquus, 384; ocellatus, 375; omphalodes, 375; opacus, 377; pallidus, 378; parmula, 375; partitus and var. cuneatus, 375; passerinus, 377; Persoonii, 51; perula, 376; pes simiæ, 378; petalodes, 380; picipes, 377; pinsitus, 51; plebeius, 382; polydactylus, 380; porphyritis, 379; procerus, 375; psilodermeus, 382; renatus, 375; rhipidius, 379; rhytiphlœus, 382; rufo-atratus, 376; sanguineus, 50, 378; scalaris, 381; sector, 384; seminigrita, *Berk. & Cooke, n. sp.*, 377; senex, 381; semiclausus, 378; setiporus, 383; similis, 375; stereinus, 379; stipitarius, 375; sulcifer, *Berk. & Cooke, n. sp.*, 383; substuppeus, *Berk. & Cooke, n. sp.*, 380; trichomallus, 380; variabilis, 378; velutinus, 383; vernicosus, 376; vespilloneus, 383; Weddellii, 375; xerophyllaceus, 383; xylodes, 375; xylostromatoides, 384; zonalis, 381.

Page

Polysiphonia abscissa, 199; anisogona, 44; calothrix, 31; elongata, colouring-matter of, 38; gorgoniæ, 487; Hookeri, 447; incompta, 40; parasitica, *Huds.*, var. reptans (=P. dendritica, *Mont.*), 452; villum, 452.

Polytrichum juniperinum 63

—— piliferum 59

Pontederaceæ, doubtful in character 496

Pool, Mr. W., collection of ferns and lichens from Madagascar, 409, 411

Porosoma hispidulum, 232; sphinctrinum, 232.

Porothelium rugosum 386

Porphyra laciniata, 42, 46, 203, 487; vulgaris of Kerguelen, 46; vulgaris, spectral bands of (woodcut), 37, and colouring-principles in, 38.

Potentilla leuconota, 142; nepalensis, 142; sp.? of, 142.

Potts, T. H., on ferns, Rakaia River, Canterbury, New Zealand . . 423

Prasiola calophylla (footnote on), 40; Sauteri, 203.

Premna interrupta 145

Prenanthus, sp.? 148

Primary groups of Monocotyledons, by G. Bentham 490

Primulaceæ 144

Principles of terminology in Monocotyledons, discussed by G. Bentham 502–518

Pringlea antiscorbutica . . 54, 483

Prunella vulgaris 145

Psilopilum australe, 72; trichodon, 68, 190.

Psilotum of Admiralty Islands, habits of species, 76; complanatum, 112; triquetrum, 112.

Psoroma, hirsutulum, *Nyl., n. sp.* 184

Pteris aquilina, 153, 424; biaurita, 414; cretica, 153; incisa, *Thunb.*, var. aurita, *Blume*, 106, 424; lanceæfolia, 415; longifolia, 106; macrodon, *Baker, n. sp.*, 414;

Page
madagascarica, 414; pedata, 415; platyodon, *Baker, n. sp.*, 415; quadriaurita, 153, 414; Wallichiana, 153.
Pterula plumulosa, 392; multifida, 83.
Ptilonia magellanica 45, 200
Ptilota Eatoni, *Dickie, n. sp.*, 202; parva, *Dickie, n. sp.*, 452.
Ptychomnion densifolium . . . 63
Puccinia aranja 394
Pueraria?, from Tanganyika . . 90
Punctaria latifolia 449
Pyrenastrum americanum, sp. . . 445
Pyrenocarpei 180, 191, 234
Pyrus indica, 142; lanata, 142.
Pyxine petricola, *Nyl.*, *n. sp.* . . 435
Pyxinei 435

Quercus Andersoni, 125; annulata? 125; lamellosa, 125.
Quernales of Darjeeling 125

Rachopilum tomentosum . . . 61
Ralfsia expansa 487
Raoul Island, algæ obtained near . 241
Ramalina canaliculata, 434, var. brevior, *Cromb.*, 434; cuspidata, 167; farinacea, 434, var. pendula (*Schrad.*), 434; gracilenta, 434, var. nodulosa, *Cromb.*, 434; intermedia, 434; linearis, 227; sepiacea terebrata, *Tayl.*, 227; subfraxinea, 227, 434; Yemensis, 167.
Ramalinei 167, 227, 434
Rampinia, *C. B. Clarke, n. gen.* of Cucurbitacea 129, 131
—— herpetospermoides, *C. B. Clarke, n. sp.* 130
Ranunculaceæ of Darjeeling . . 133
Ranunculus crassipes of Kerguelen, remarks on by Mr. Moseley . . 53
Red Algæ, colouring-matter of . . 34
——, spectral bands of . . . 36
Reichenbach, Prof. H. G., on Orchidaceæ from 'Challenger' exped. 112
Reinsch, P. T., On freshwater Algæ of Kerguelen, collected by the Rev. A. E. Eaton, Venus-trans. exped. 205
Remarks on the geographical position and geology of Marion Island, by H. N. Moseley . 481, 482
Report on fungi of Kerguelen collected by the Rev. A. E. Eaton during Trans. of Venus Exped., by the Rev. M. J. Berkeley . . 221
Restiaceæ, glumal arrang. of . . 505
Revision of genera and species of Anthericeæ and Eriospermeæ, by J. G. Baker 253
Rhabdonema, undescribed species of, from sea near Kerguelen . . 56
Rhamnaceæ 143
Rhamphicarpa Cameroniana, *Oliv.*, *n. sp.*, 95; tubulosa, *Benth.*, and var., 91.
Rhinotrichum pallidum, *Berk. & Broome, n. sp.* 85
Rhizocladia, *Reinsch, gen. nov.* . . 219
—— repens, *Reinsch, n. sp.* . . . 220
Rhizomorpha corynephora, 398; sp.? in Admiralty Islands, 78.
Rhizosolenia calyptra, 56; imbricata, 56; setigera, 56; styliformis, 56.
Rhododendron arboreum, 135; argenteum, 135; barbatum, 135; Falconeri, 135.
Rhodomela Gaimairdi, 204; Hookeriana, *J. Ag.*, 199.
Rhodomelaceæ, 31, 40, 42, 44, 48, 199, 235, 238, 245, 447, 452, 488.
Rhodophyllis capensis, 201; volans, 448.
Rhodymenia palmata, 201; variolosa, 45.
Rhodymeniaceæ, 45, 48, 201.
Rhus 136
—— insignis, *Del.*, var. 91
Ribes glaciale 143
Ricasolia dissecta 410
Riedel, collection of N. Celebes plants 97
Roccella Montagnei, *Bel.*, var. teretior, *Cromb.* 433
Roccellei 433
Rodriguez, botany of, letter on, by I. B. Balfour, 24; lichens from, 431; Mathurina, *n. gen.* of Turneraceæ from, 159.
Roots and rootstocks of Anthericeæ and Eriospermeæ 254
Rosa sericea 142
Rosaceæ of Darjeeling 140
Roscoëa lutea abundant in Tonglo 120
Roxburgiaceæ, how differing from Liliaceæ 495
Rubia cordifolia? 149
Rubiaceæ 149
Rubus betulinus, 140; macrocarpus, *King, n. sp.*, *MS.*, 141; paniculatus, 140; pentagonus,

Page

140; rosæfolius, 140; species of, 140, 141.

Rumex acetosa, 137; hamatus, 137; nepalensis, 137.

Rutaceæ 135

Sabiaceæ 136

Saccolabium, small species in Darjeeling 120

Sago Palm of Admiralty Islands . 79

Salvadoraceæ and Oleaceæ, G. Bentham on 14–16

Sambucus adnata, 150; javanica, 150

Samydaceæ, a link between Passifloraceæ and Bixineæ, I. B. Balfour on 162

Sanicula europæa 150

Sapindaceæ 132

Sarcococca pruniformis 125

Sarcopyramis lanceolata 149

Sargassum affine, 488; aquifolium, 238; berberifolium, 238; biforme, 245; Binderi, 455; densum, *Dickie, n. sp.*, 453; dentifolium, 240, 241; gracile, 238, 241, 243; hemiphyllum, 449; heterocystum, 238; ilicifolium, 238, 243; incisum, *Dickie, n. sp.*, 453; lanceolatum, 238, 444; latifolium, 243; microceratum, 449; obtusifolium, 449, 453; pinnatifolium, 449; polycystum, 238; polyphyllum, 31; scoparium, 450; vulgare, 31, 238, 242.

Satyrium nepalense 121

Saurauja longifolia, *Oliv., sp. n.*, 98; nepalensis, 133.

Saussurea deltoidea 148

Saxifragaceæ of Tonglo 142

Scævola Kœnigii 29

Schizandra propinqua 133

Schizobasis, *Baker* 260

——, characters of species of, 261; flagelliformis, 261; intricata, 261; Macgowani, 261.

Schizophyllum commune, 50, 374; umbrinum, 374.

Schizosiphon kerguelenensis, *Reinsch, n. sp.* 211

Schizothrix hyalina, *Kutz.*, var. ramosissima 211

Schizymenia edulis, colouring-matter of 38

Schœnolirion, *Torrey*, subgenus of Anthericum 297

Sciaromium conspissatum . . . 68

Scindapus (Darjeeling) 120

Page

Scitamineæ, what included under, their position 493

Scleroderma stellatum 393

Scrophularia elatior, 146; urticæfolia, 146.

Scutellaria, sp.? 145

Scytanthus Currori (Hoodia), 248; Gordoni, 248.

Scytothalia obscura, *Dickie, n. sp.?* 47

Selaginella fissidentoides, 422; inæqualifolia, 78, 112; lævigata, 422; suberosa, 422; Wallichii, 112

Selinum tenuifolium 150

Selonia, *Regel* 245

—— soogdiana, *Regel* 285

Senecio acuminatus, 148; chrysanthemoides?, 148; tetranthus, 148; Wallichii, 148.

Sesamum, sp., from Tanganyika region 91

Setaria glauca 92

Seychelles, flora of 27

Siegesbeckia orientalis 148

Sikkim, remarks on vegetation of, C. B. Clarke 118

Siona, *Salisb.* 351

—— fimbriata, *Salisb.* 351

Siphonaceæ, 32, 41, 42, 46, 203, 236, 237, 239, 240, 242, 243, 244, 245, 449, 453, 454, 455.

Siphula ramalinoides, *Nyl., n. sp.*, 226, and var. comata, *Nyl.*, 226; tabularis, 166.

Siphulei 166, 226

Sirosiphon kerguelenensis, *Reinsch, n. sp.*, 212; Olivieri, *Reinsch, n. sp.*, 213; species, 166, 212; vermicularis, *Reinsch, n. sp.*, 211.

Smilacina purpurea, 122; species doubtful (Darjeeling), 122.

Solanum decemdentatum . . . 144

Sorby, H. C., on colouring-matter of red Algæ 34

Southbya stillicidiorum 59

Spec. ac gen. nov. Algarum aq. dulc. Exped. Ven. Trans. Ins. Kerguel., by P. F. Reinsch . . 205

Speirema montanum 147

Sphacelaria affinis, *Dickie, n. sp.*, 199; corymbosa, *Dickie, n. sp.*, 199; funicularis, 204; furcigera, 238, 454; pulvinata, 31.

Sphærella nitidula 397

Sphæria coccodes 397

Sphærococcoideæ, 40, 43, 44, 48, 200, 239, 240, 243, 245, 448, 451.

Page
Sphærococcus Textorei 451
Sphæronema epicœcidium . . . 394
Sphærophorei 223
Sphærophoron australe, 223, compressum, 223; coralloides, 223; madagascareum, *Nyl.*, *n. sp.*, 409; tenerum, 223, var. compactum, 223.
Sphæropteris barbata 152
Sphærostilbe cinnabarina, 394; gracilipes, 86; lateritia, 394.
Sphæranthus, sp. nov. ?, allied to S. peduncularis 91
Sphenoclea, G. Bentham on . . 13
Spikelet of Gramineæ, homology of its parts 515
Spiræa callosa 140
Spiral arrangements, parts of flower, Dr. Masters on 466
Spiranthus australis 120
Spirogyra condensata, 446; quinnia, 446; sp. ?, Philippines and Admiralty Islands, 489.
Splachnidium rugosum 41
Sporidesmium antiquum, *Cd.*, var. sparsum 44
Sporochnaceæ . . . 42, 44, 47, 198
Sport in Paritium tricuspe, G. B. King on 101
Squammariaceæ 245, 454
Stamens of Eriospermeæ and Anthericeæ 255
Staminal pistillody in an Acanthad, by S. Le M. Moore 86
Stapelia Gordoni 248
Stellaria crispata, 137; longissima, 137; sikkimensis, 137.
Stemonitis dictyospora, 84; fusca, 393; scintillans, *Berk. & Broome*, *n. sp.*, 84.
Stems and general habit of Eriospermeæ and Anthericeæ . . . 255
Sterculia comosa 98
Stereocaulei 128, 223
Stereocaulon cymosum, *Cromb.*, *n. sp.*, 182; ramulorum, *Ach.*, and var. macrocarpum, *Reich.*, 223; tomentosum and var. magellanicum, 224.
Stereodon cupressiformis . 63, 71, 195
Stereum alliciens, *B. & Cooke*, *n. sp.*, 389; alutaceum, *B. & Cooke*, *n. sp.*, 388; cyathiforme, 388; elegans, 388; elevatum, *B. & Cooke*, *n. sp.*, 388; fissum, 389; Galeottii, 389; hydrophorum, 388; Kunzei, 51; lobatum, 389; melaleucum, 389; nephrodes, 389; nitidulum, 388; obliquum, 389; papyrinum, 51, 389; partitum, 389; Ravenelii, 388; scytale, 389; spathulatum, 389; Sprucei, 389; striatum, 389; versicolor, 51.
Sticta aurata, 167, 435; crocata, 167; damæcornis, 230; endochrysea, *Del.*, 230, and var. vaccina (*Mnt.*), 230; fossulata, *Duf.*, var. physciospora, *Nyl.*, 230; Freycinettii, 230; gilva, 167;ineariloba, 230; nitida, 230; obvoluta, 230; orygmæa, 230; pulmonaria, var. hypomela, *Del.*, 167; quercizans, 167; Urvillei, *Del.*, var. flavicans (*Hook.*), 230, and var. orygmæoides, *Nyl.*, 230.
Stictei 167, 229, 435
Stictina agyracea, var. insidiata, *Nyl.*, 435; aurata, 410; carpoloma, 229; damæcornis, 410; dissimilis, 435; faveolata, 229, var. cervicornis, *Flot.*, 229; filicina (*Ach.*), *Nyl.*, 229, and var. f. latissima, *Nyl.*, 229; fuliginosa, 229, and var. firmior, *Crombie*, 229; hirsuta, 229; intricata, var. Thouarsii (*Del.*), 229; mougeotiana, 110; plumbea, 410; quercizans, 229; retigera, 410; umbavillaria (*Bor.*), var. papyrina, *Nyl.*, 410; variabilis, 410.
Stigeoclonium Hookeri, *Reinsch*, *n. sp.*, 216; subtile, *Reinsch*, *n. sp.*, 217.
Stigmatic dilatation of Apocyneæ and Asclepiadeæ &c. 5
—— ring of Ericaceæ &c. . . . 4
Stigmatidium graphioides, *Crombie*, *n. sp.* 233
Stilbum stromaticum 394
Stipa, species from Tanganyika region 92
Streptanthera, *Baker*, subgenus of Anthericum 297
Streptopogon australis, *Mitt.*, *n. sp.* 66, 194
Striga elegans 91
Strobilanthes attenuatus, 146 divaricatus, 146; pectinatus, 146; Wallichii, 146.
Strychnos, species from Tanganyika region 91
Style-plates of Geraniaceæ and Balsamineæ 4
Stylideæ, G. Bentham on . . . 2

Page
Stypandra, *R. Br.* 355
—— cæspitosa, 355; coarctata, 356; glauca, 356, var. propinqua, *A. Cunn.*, 356, and var. grandiflora, *Lindl.*, 356; scabra, 356; subgenera of, 355; umbellata, *R. Br.*, 356, var. Fraseri, *Baker*, 356.
Styponema, subgenus of Stypandra 355
Styrax serrulatum 143
Substitution of one organ for another, Dr. Masters on 470
Sugar-cane of Admiralty Islands . 81
Superposed arrangement, parts of flower, by Dr. M. Masters . . 456
Superposition of whorls 462
Supplement to the enumeration of fungi of Ceylon by the Rev. M. J. Berkeley and C. E. Broome . 82
Supplemental notes on Algæ of 'Challenger' exped., by Prof. Dickie 486
Swertia bimaculata 143
Symphyogyna podophylla . 69, 197
Symplocus racemosus ?, 143; species of, 143.
Syringeæ, structure of, &c. . . . 15

Tabular arrangement of Monocotyledons, by G. Bentham . . . 490
Taccaceæ, distinguishing characters &c 494
Tacca palmatifida, *Baker*, *n. sp.* . 100
Tanganyika, plants from region around 90
Tarrietia Riedeliana, *Oliv.*, *sp. n.* . 98
Temnoma quadripartita 68
Teneriffe, Musci and Hepaticæ of . 59
Terebraria kerguelensis, *O'Meara*, *n. sp.* 56
Terminology in Monocotyledons, remarks on, by G. Bentham . . 490
——, Kunth's, anomalous as to grasses 513
——, two great laws, in accord. to G. Bentham 514
Terms applicable in the definition of glumes &c. 503
Ternate, orchids of 112
Ternströmiaceæ 133
Tetranthera angustifolia, 139; sikkimensis ?, 139.
Thalictrum Chelidonii 133
Thamnolia vermicularis, var. taurica (*Wulf.*) 226
Thamnomyces Chamissonis, 396; fuciformis, 396; rostratus, 396.
The Fungi of Brazil, by the Rev. M. J. Berkeley and M. C. Cooke 363
The Musci and Hepaticæ collected by H. N. Moseley, M.A., naturalist to H.M.S. 'Challenger,' by William Mitten 59
Thelephora actiniæformis, 387; caperata, 387; ocreata, 387; pilosiuscula, 387; prolifera, 388; subclavæformis, 387; trachodes, 387.
Thelotremei 175, 233
Thespesia populnea 80
Thladiantha calcarata (Momordica) 126
Thuidium curvatum 63
Thunbergia coccinea, 146; lutea, 146; sp. near T. oblongifolia, *Oliv.*, 92.
Thuretia teres 447
Thymelaceæ 139
Thysanella (*Salisb.*), subgenus of Thysanotus, *R. Br.* 335
Thysanocladia laxa 448
Thysanotus, *R. Br.* 334
——, characters, subgenera, and species of 335
—— anceps, 339; arbuscula, *Baker*, *n. sp.*, 339; asper, 338; Baueri, 336; chinensis, 337; dichotomus, 339; Drummondii, *Baker*, *n. sp.*, 341; flexuosus, 339; glaucus, 341; gracilis, 338; hispidulus, 341; junceus, 338; multiflorus, 340; paniculatus, 337; Patersoni, 340; pauciflorus, 341; sparteus, 338; tenuis, 337; thyrsoideus, *Baker*, *n. sp.*, 336; triandrus, 340; tuberosus, 335; scaber, 336.
Tiliaceæ of Darjeeling 132
——, relative position of perianth &c 471
Tobacco, the plant yielding Latakia, W. T. T. Dyer on 246
Todea hymenophylloides 426
Tongatabu, Algæ from 235
Torrubia bicephala, 394; sphingum, 394; unilateralis, 394.
Torsion of axis in whorl, remarks on, by Dr. Masters 471
Tortula bermudana, *Mitt.*, *n. sp.*, 60; erubescens, 66; fuegiana, 194; melanocarpa, *Mitt.*, *n. sp.*, 60; serrulata, 66.
Trachyandra, *Kunth*, a subgenus of Anthericum 307
Trachylobium Hornemannianum . 234
Trail, J. W. H., collection of Brazilian fungi (Berkeley and Cooke) 363

Page

Trametes actinopilus, 385; æthaloides, 385; fibrosa, 384; hydnoides, 385; lactinea, 385; Marchionica, 385; Mulleri, 385; occidentalis, 385; rigida, 385; sclerodepsis, 385; Sprucei, 385; versatilis, 385.

Transit-of-Venus Expedition, Cape lichens, 165; Kerguelen Algæ, 198, 205, Fungi, 221; Rodriguez, flora generally, 24, lichens, 431.

Tremella fuciformis, 392; lutescens, 392; pulvinus, *B. & Cooke, n. sp.*, 392.

Treptacantha Sonderi 450

Trichia clavata 84

Trichodesma zeylanicum . . . 91

Tricholæna rosea 92

Trichomanes filicula, *Bory*, var. from N. Guinea, 30; filicula, 105; humile, 105; javanicum, 78, 105; Motleyi, 105; peltatum, 105; peltatum of Admiralty Islands, Mr. Moseley's remarks on, 78; pyxidiferum, 105, 413; quercifolium, 413; radicans, var. T. giganteum, *Bory*, 413.

Tricorne, *R. Br.* 361

—— anceps, 363; elatior, 362, and var. scabra, *R. Br.*, 362; humilis, 362; muricata, *Baker, n. sp.*, 363; pterocaulon, *Baker, n. sp.*, 363; simplex, 362; tenella, 362.

Trimen, Henry, note on Boëa Commersonii, *R. Br.* 163

Tripogon, subgenus of Bulbine, *L.* 343

Tristan d'Acunha, cryptogamic flora of 52, 61

Triumfetta semitriloba, *L.*, or T. rhomboidea, *Jacq.* (Tanganyika) 90

True superposition, Dr. M. Masters on 459

Trypethelium cruentulum, 445; cruentum, 444.

Turbinaria ornata, 31; vulgaris, 230, 240, 244, 453.

Turpinia pomifera 132

Turnera angustifolia 160

Turneraceæ, a new genus of, I. B. Balfour on, 159; affinity with Bixineæ, 162.

Tylimanthus viridis, *Mitt., n. sp.* . 197

Typhula Traillii, *B. & Cooke, n. sp.* 391

Page

Udotea Desfontianii, 237; flabelata, 449, 488.

Ulothrix fusca, *Dickie, n. sp.* . . . 240

Ulva latissima, 33, 47, 203, 237, 453, 487; reticulata, 243, 244.

Ulvaceæ, 33, 42, 46, 203, 236, 237, 242, 243, 244, 452, 454, 455, 487.

Umbelliferæ of Darjeeling . . . 150

Umbilicaria pustulata, 171; rubiginosa, 171.

Uncinia of Kerguelen 53

Urceolaria deuteria, 175; subcuprea, *Nyl., n. sp.* 175

Urtica parviflora 123

Urticaceæ very abundant in wet jungle of Sikkim 123

Usnea ceratina, 226; dasypogoides, *Nyl., n. sp.*, 433; florida, 166, 433, var. f. dasycera, *Nyl.*, 226; and f. rubiginea (*Mich.*), 166, 410; lacunosa, 227; longissima, 166; xanthopoga, *Nyl., n. sp.*, 410, and var. rubiginescens, 410.

Usneei 166, 182, 226, 433

Ustilago carbo 49

Utricularia multicaulis? 147; orbiculata, 147.

Vacciniaceæ, Darjeeling to Tonglo 149

Vacoas (Pandani), kinds of, in Rodriguez, I. B. Balfour on, 24; var. calé, var. chevron, var. mâle var. parasol, var. poteau, and var. sac, 24.

Valeriana, sp.? 147

Valonia fastigiata, 237, 239, 245; utricularis, 244.

Valoniaceæ, 33, 237, 244, 245, 449, 454, 455

Vegetable food-products, clothing, &c. of natives of Admiralty Islands 80

Vegetation, change of botanical character of, by manuring . . 17

Verbenaceæ 145

Verinea, subgenus of Asphodelus, *L.* 269

Vernonia obconica, *Oliv. & Hiern. ined.*, sp. from Tanganyika region, 91; pauciflora? *Less.*, 91.

Verrucaria æthiobola, 192; chlorotica, 444; denudata, 444; dermoplaca, *Nyl., n. sp.*, 234; 5-septatula, *Nyl., n. sp.*, 444; insueta, *Nyl., n. sp.*, 192; kerguelena, *Nyl., n. sp.*, 192; obfuscata, *Nyl., n. sp.*, 191; prævales-

Page
cens, *Nyl.*, *n. sp.*, 192; tessellata, *Nyl.*, *n. sp.*, 191
Viburnum coriaceum, 150; erubescens, 150.
Vigna lutea 76
Vines, S. H., on digestive ferment of Nepenthes 427
Violaceæ of Darjeeling 132
Vitex, uncertain species of, from Tanganyika region 92
Vitis capriolata, 134; new species, but unnamed, from Darjeeling, 135, and Tanganyika region, 90; tenuifolia, 134.
Vittaria elongata, 111; lineata, 159.

Walleria Mackenzii 92
Waltheria americana 90
Warea, *C. B. Clarke*, a new genus of Cucurbitacea 127, 130
—— Tonglensis, *C. B. Clarke*, *n. sp.* 129
Wedelia biflora 30
Weissia calcarea 63
Whitfieldia lateritia, *Hook.*, staminal pistillody in 86
Woodwardia radicans 153
Wormskioldia 160
Wrangellia plebia 488

Page
Wrangelliaceæ 488

Xeronema, *Brong. & Gris.* 287
—— Moorei 288
Xylaria abnormis, 396; allantoidea, 395; Apeibæ, 396; conocephala, 395; dealbata, 395; digitata, 395; filiformis, 395; grammica, 394; Guepini, 395; hyperythra, 395; hypoxylon, 395; iantho-velutina, 395; inæqualis, 395; involuta, 51; marasmoides, 396; pallida, *B. & Cooke*, *n. sp.*, 395; polymorpha, 395; rhopaloides, 395; Schweinitzii, 51; scopiformis, 395.
Xyrideæ, what associated with, and homology, parts of flower . 497

Zanthoxylum alatum 136
Zanzibar copal or Animi, tree which yielded same 234
Zinziberaceæ on Tonglo ridge . . 120
Zonaria obscura, *Dickie*, *n. sp.*, Is. Mangaia, S. Pacific, 31; variegata, 237, 245, 451.
Zygodon Brownii 67
Zygogonium delicatulum, 446; tenuissimum, *Reinsch*, *n. sp.*, 218.

END OF THE FIFTEENTH VOLUME.

PRINTED BY TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

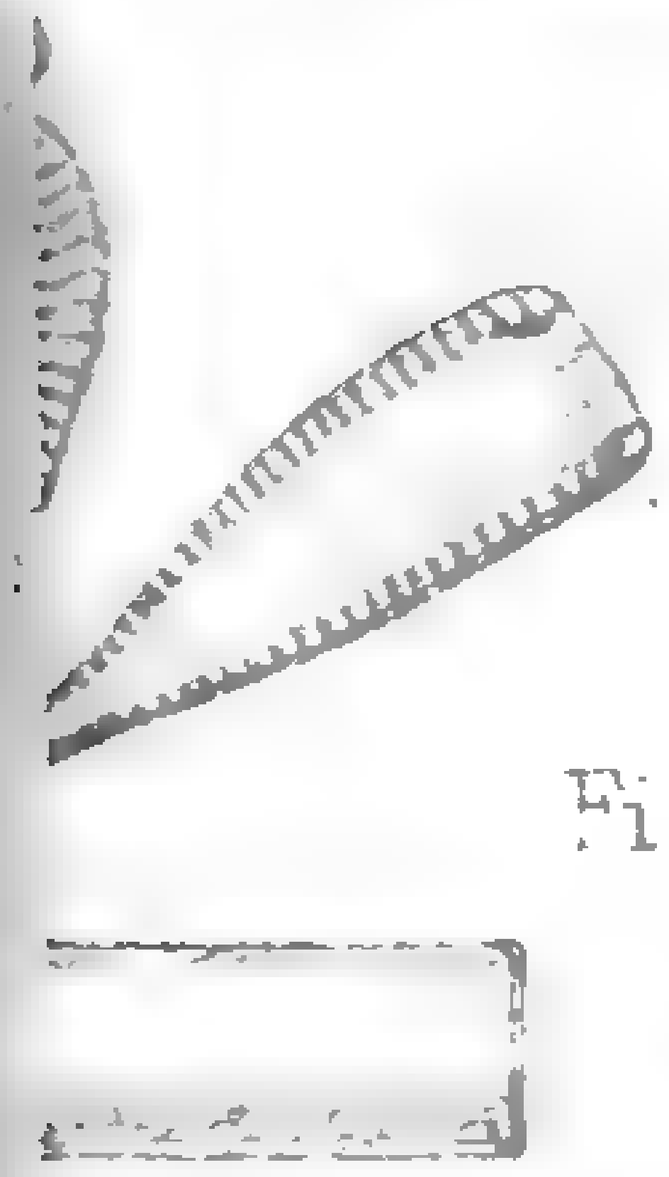


Fig. 1.

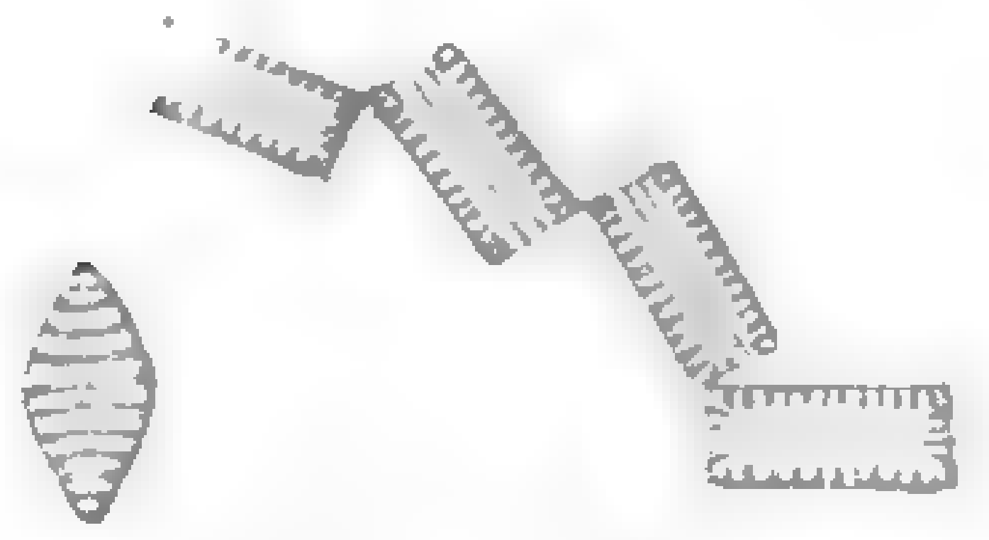


Fig. 2.

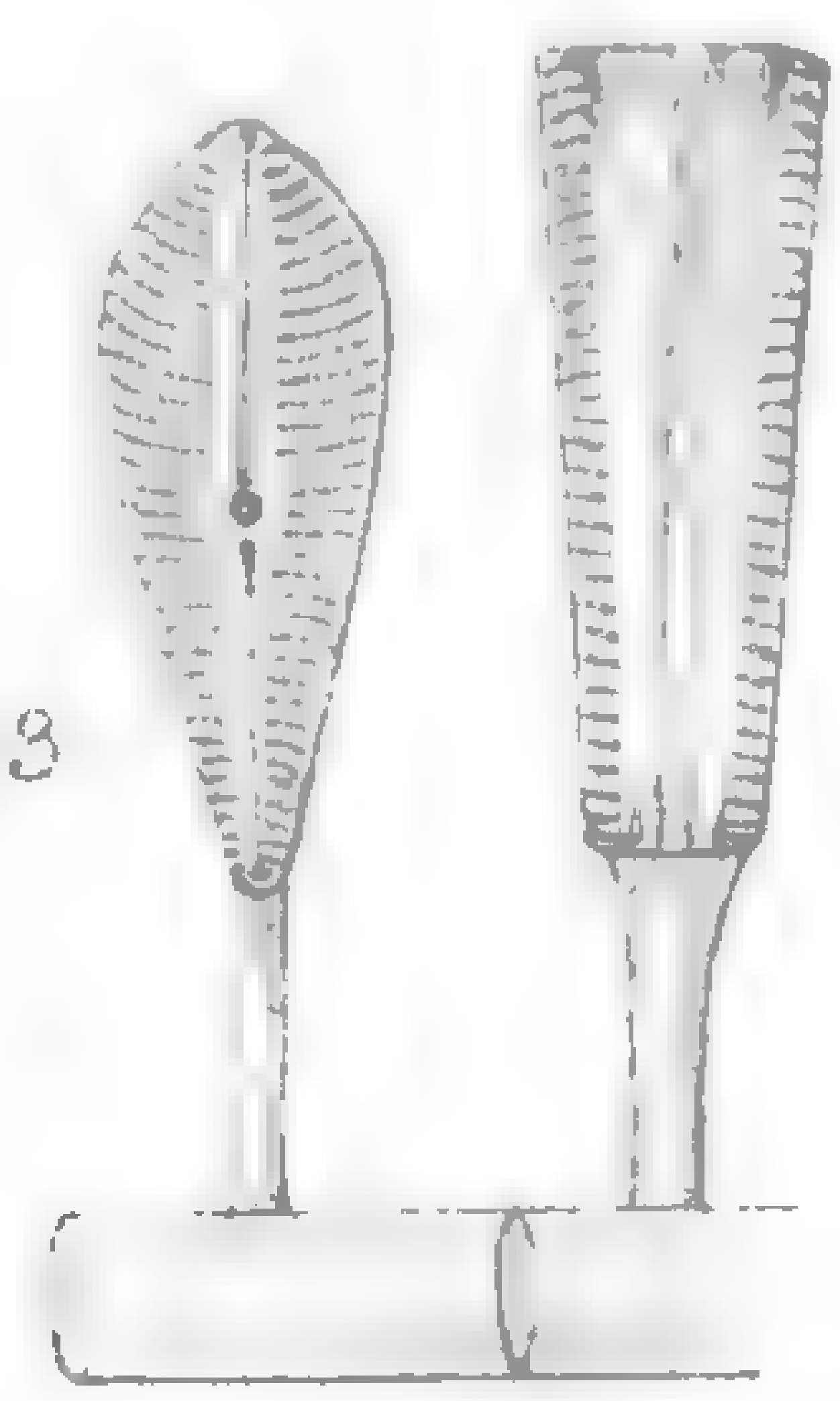


Fig. 3

Fig. 6.

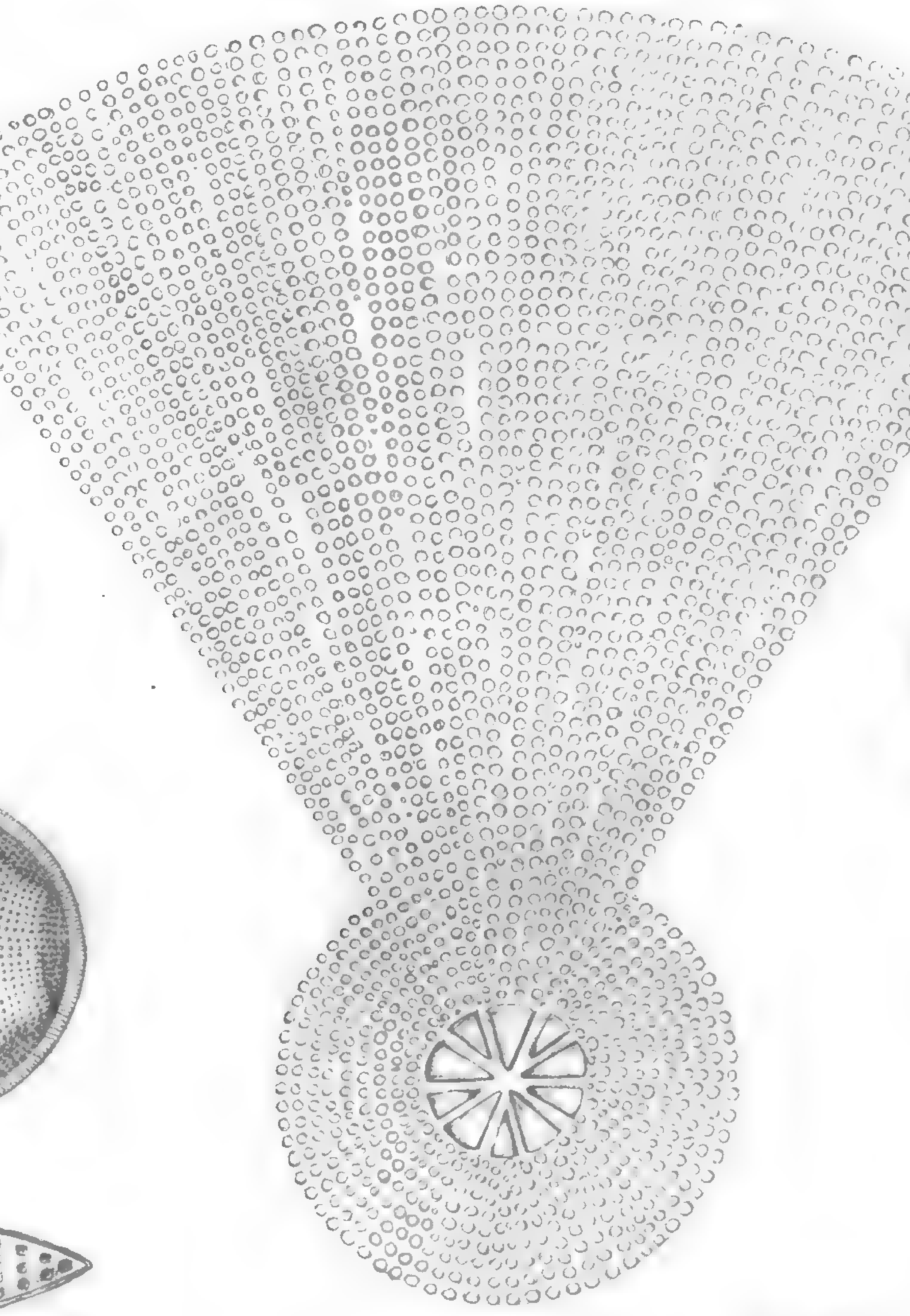


Fig. 5.

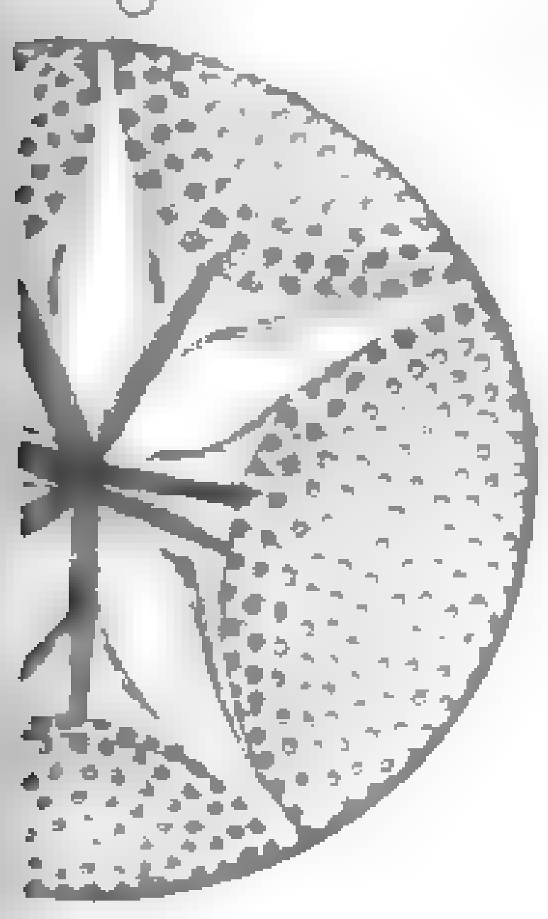


Fig. 8.

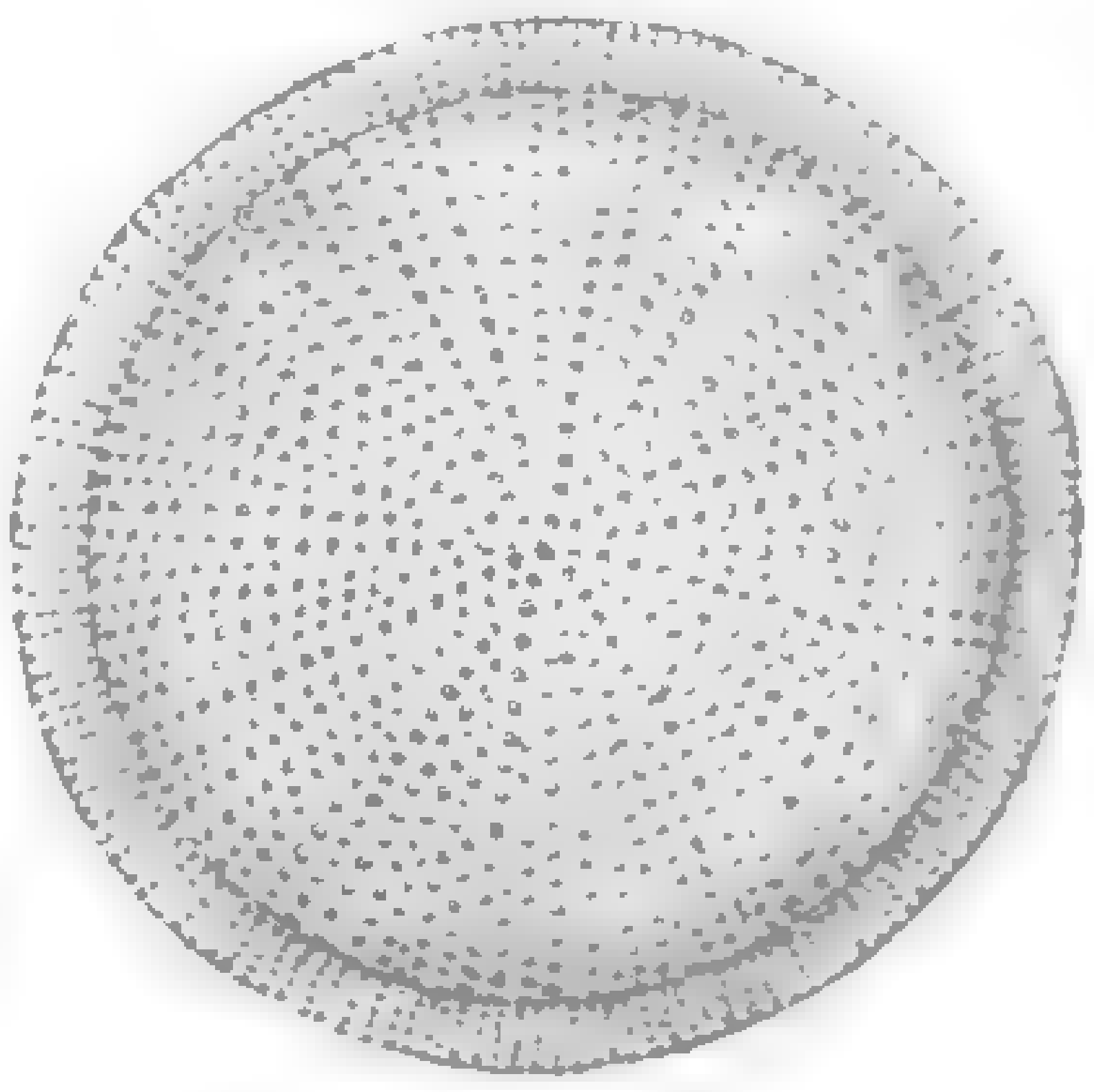


Fig. 7.

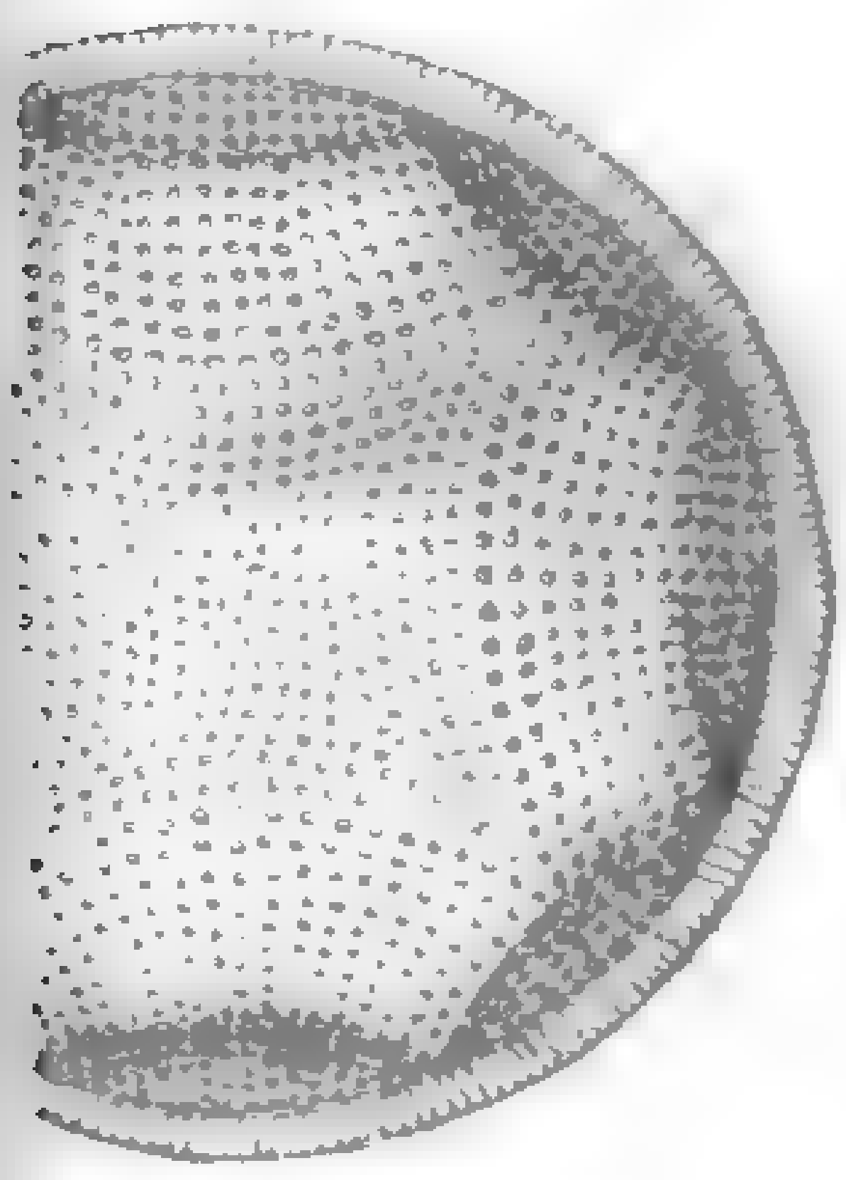


Fig. 10.

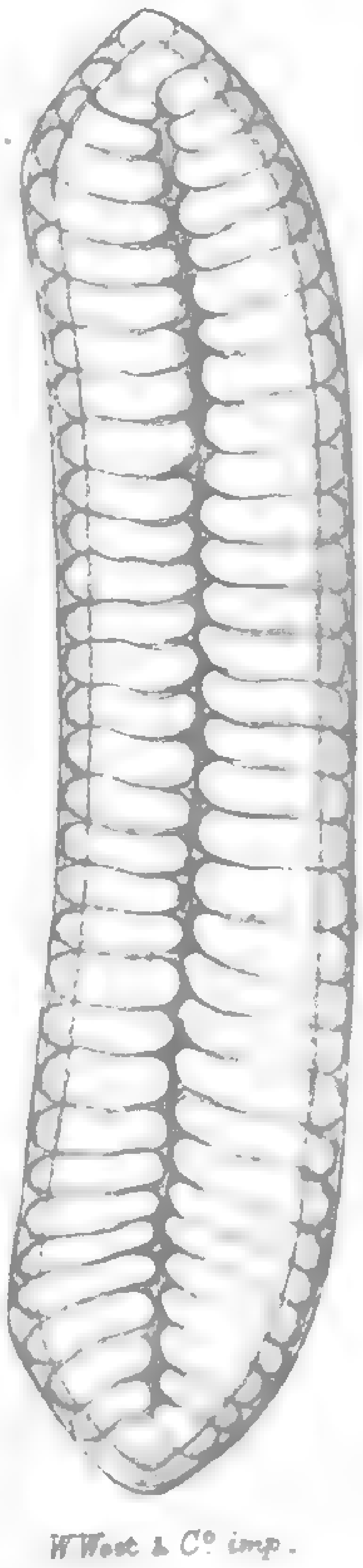


Fig. 4.

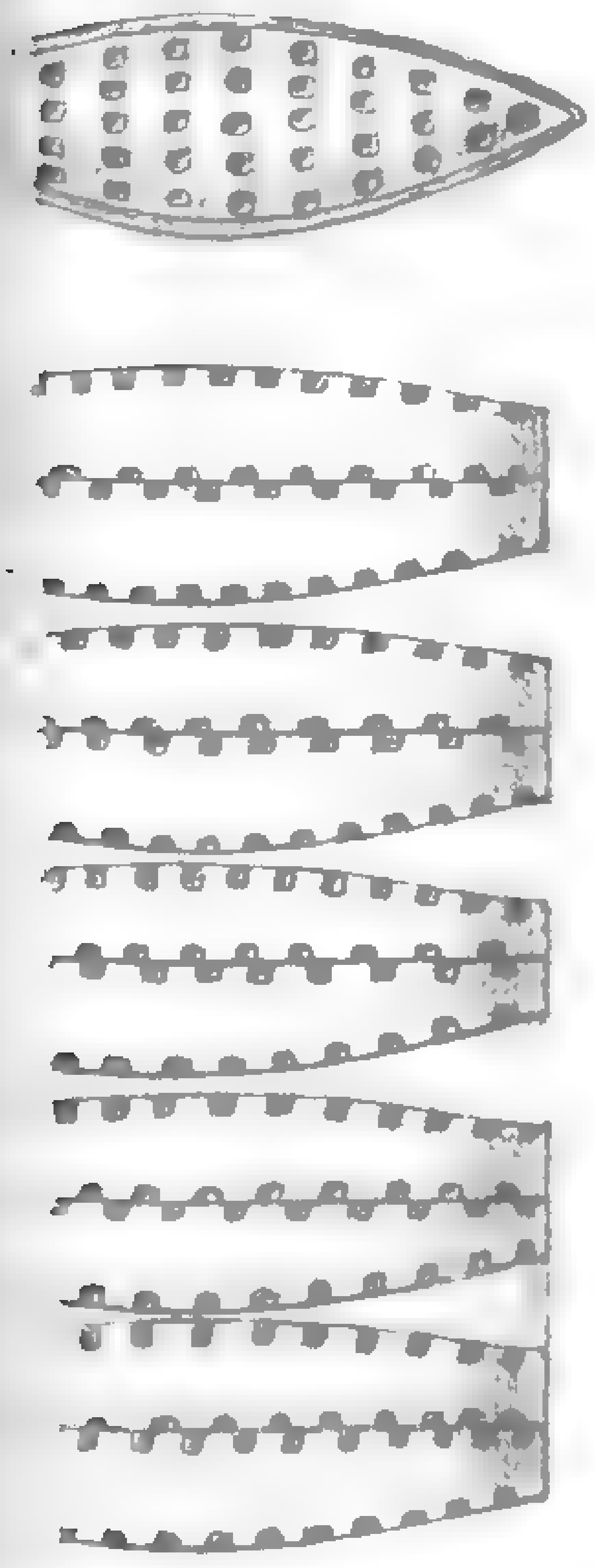


Fig. 9

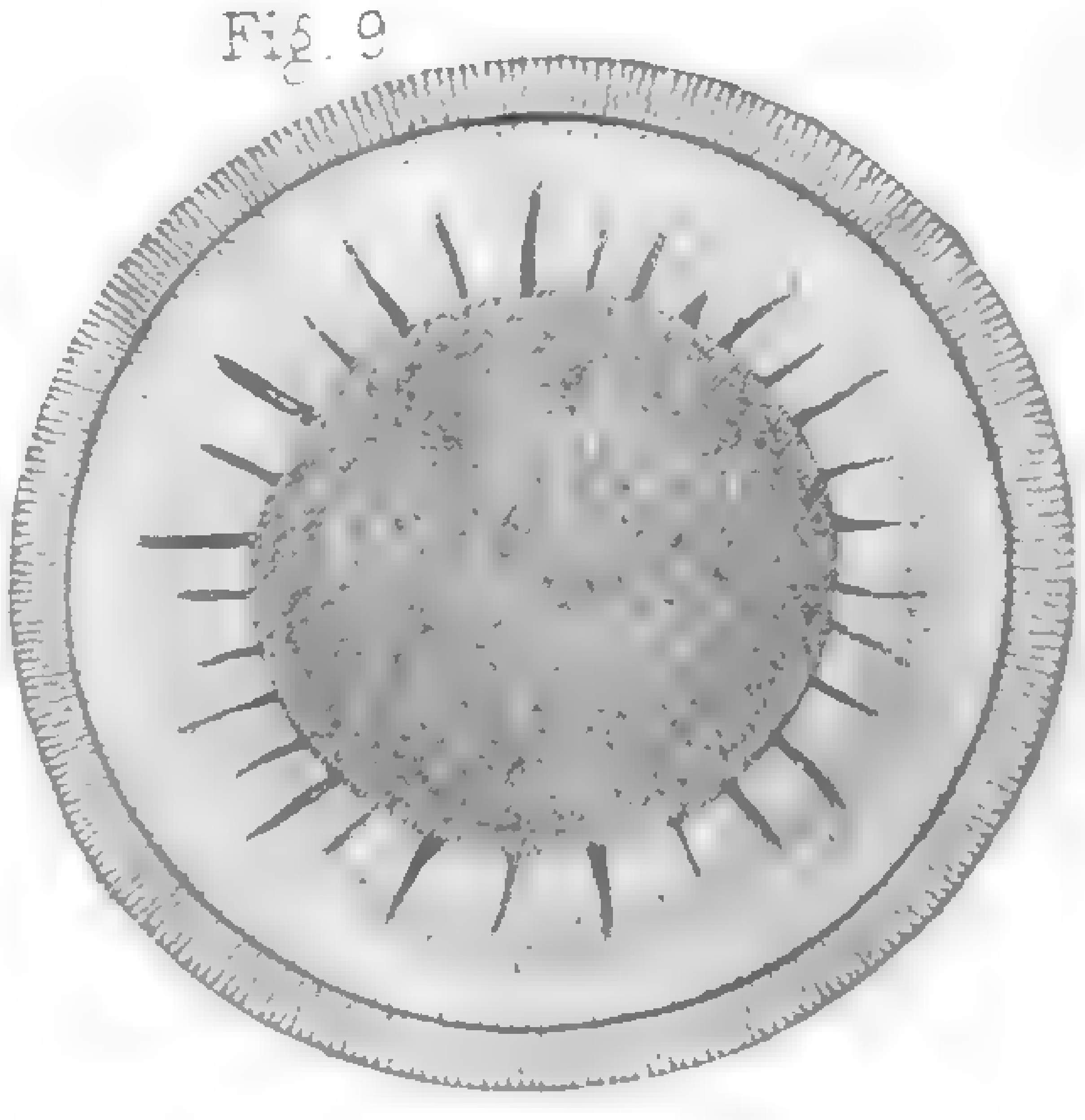
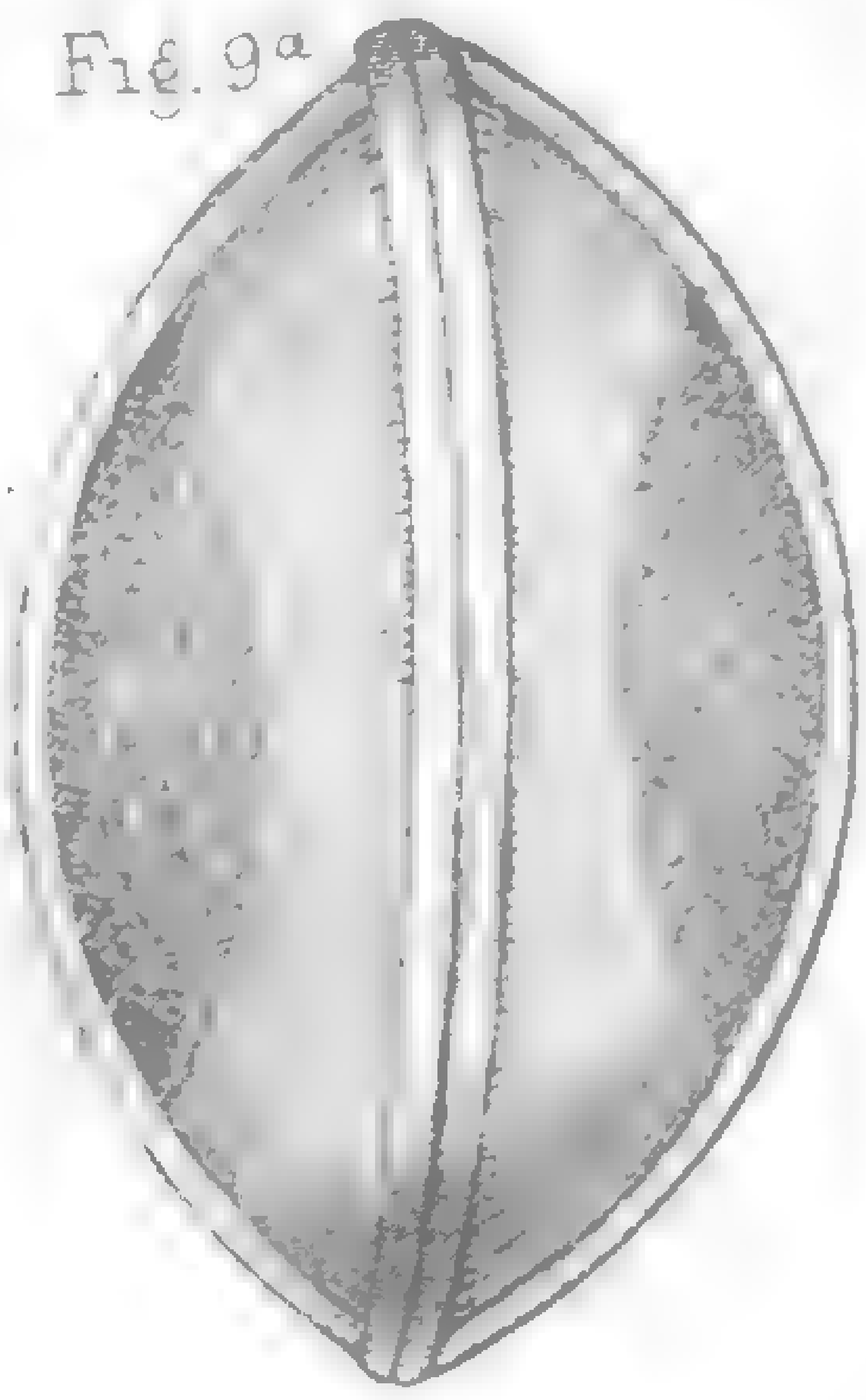


Fig. 9a



ra del. Tuffen West sc.

W West & Co imp.

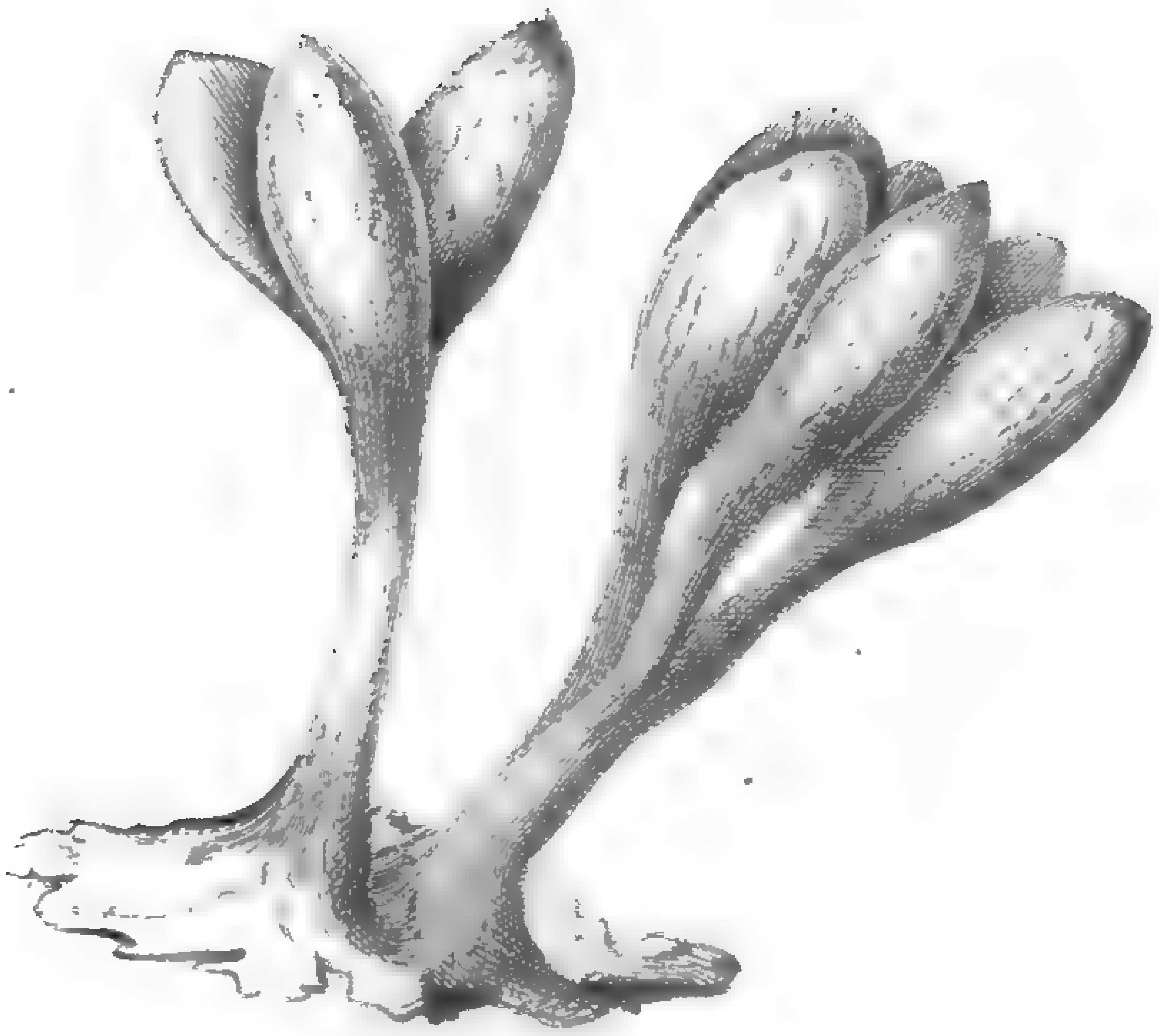


Fig. 1.

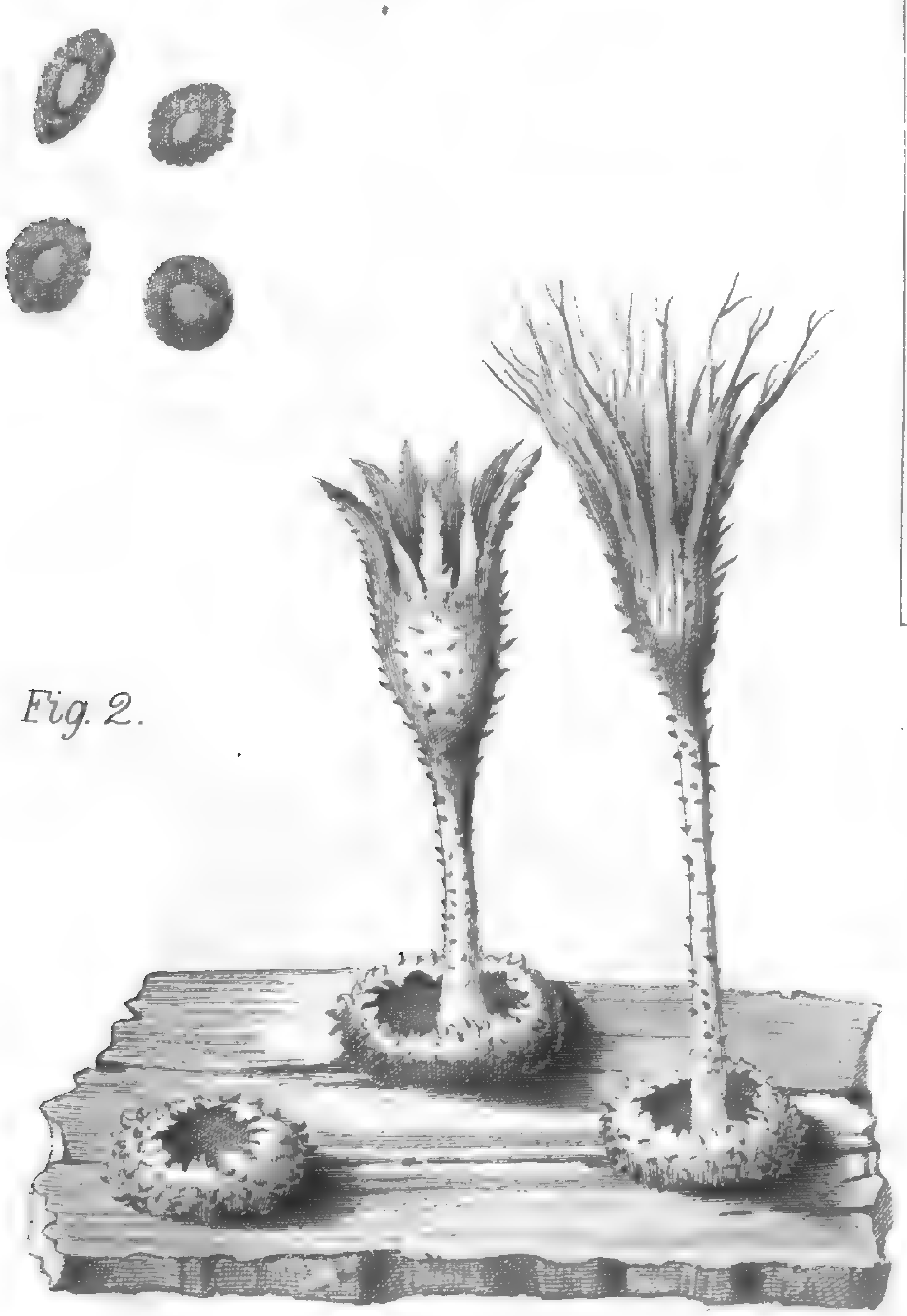


Fig. 2.

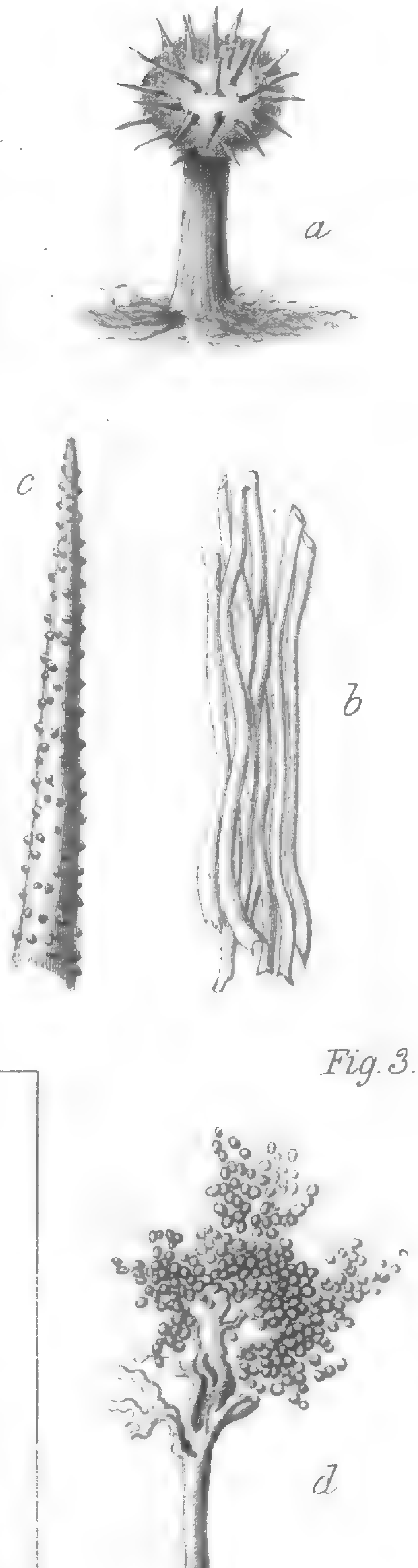
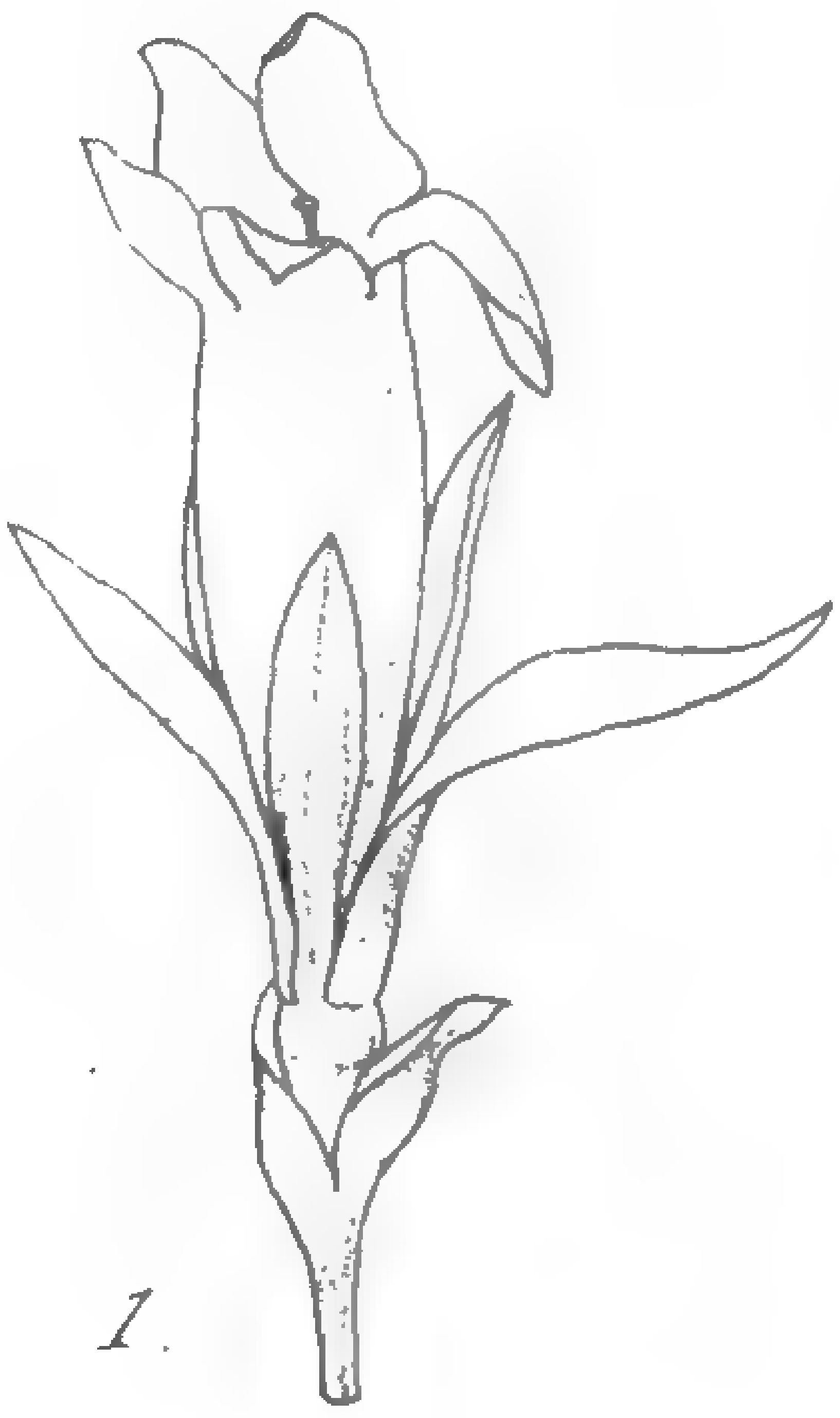
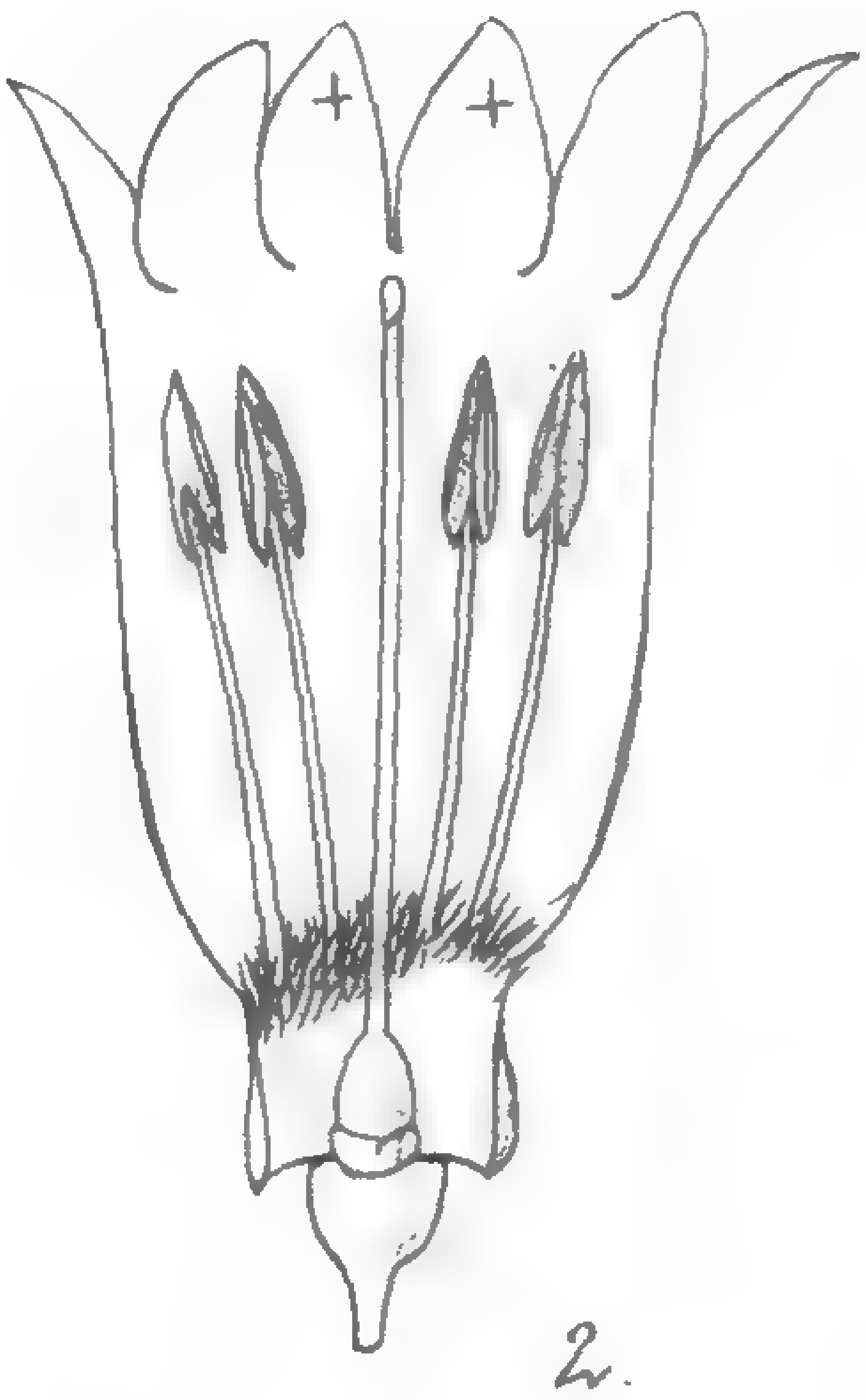


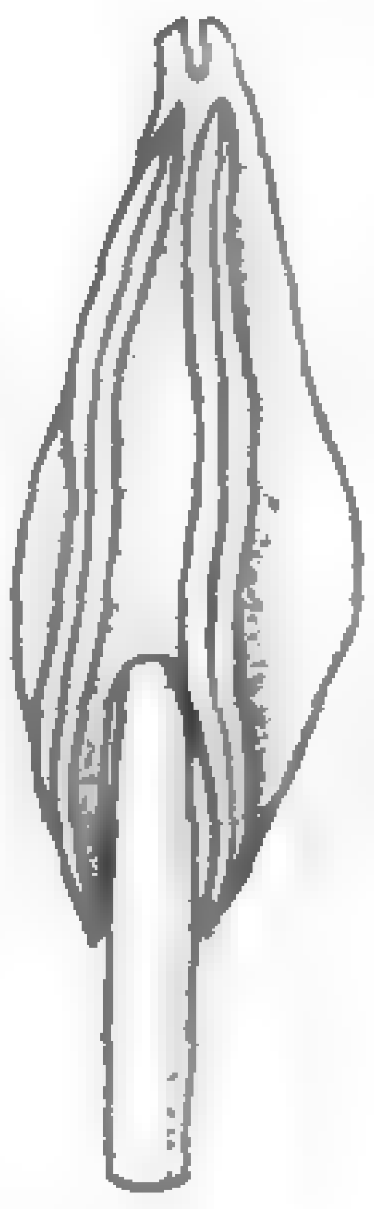
Fig. 3.

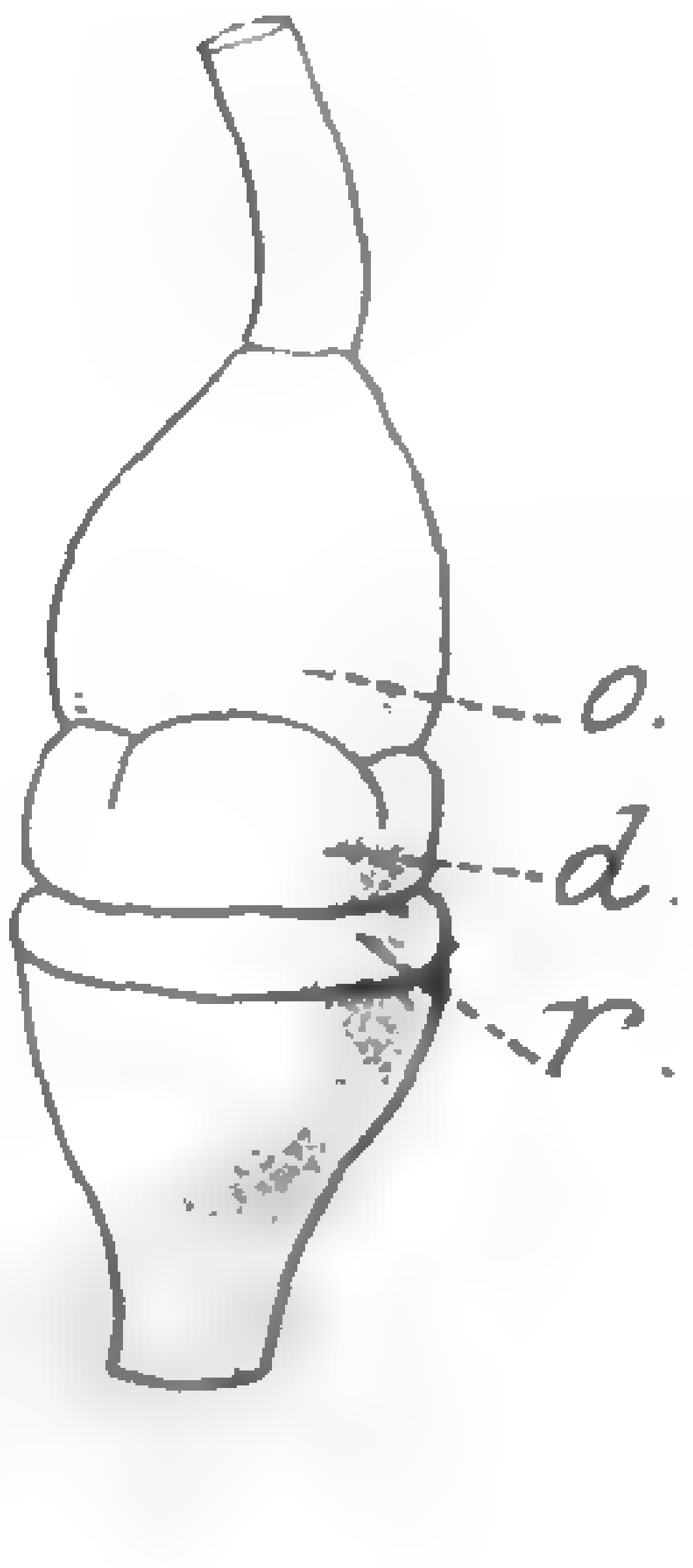
E.B. del.

G. Jarman sc.

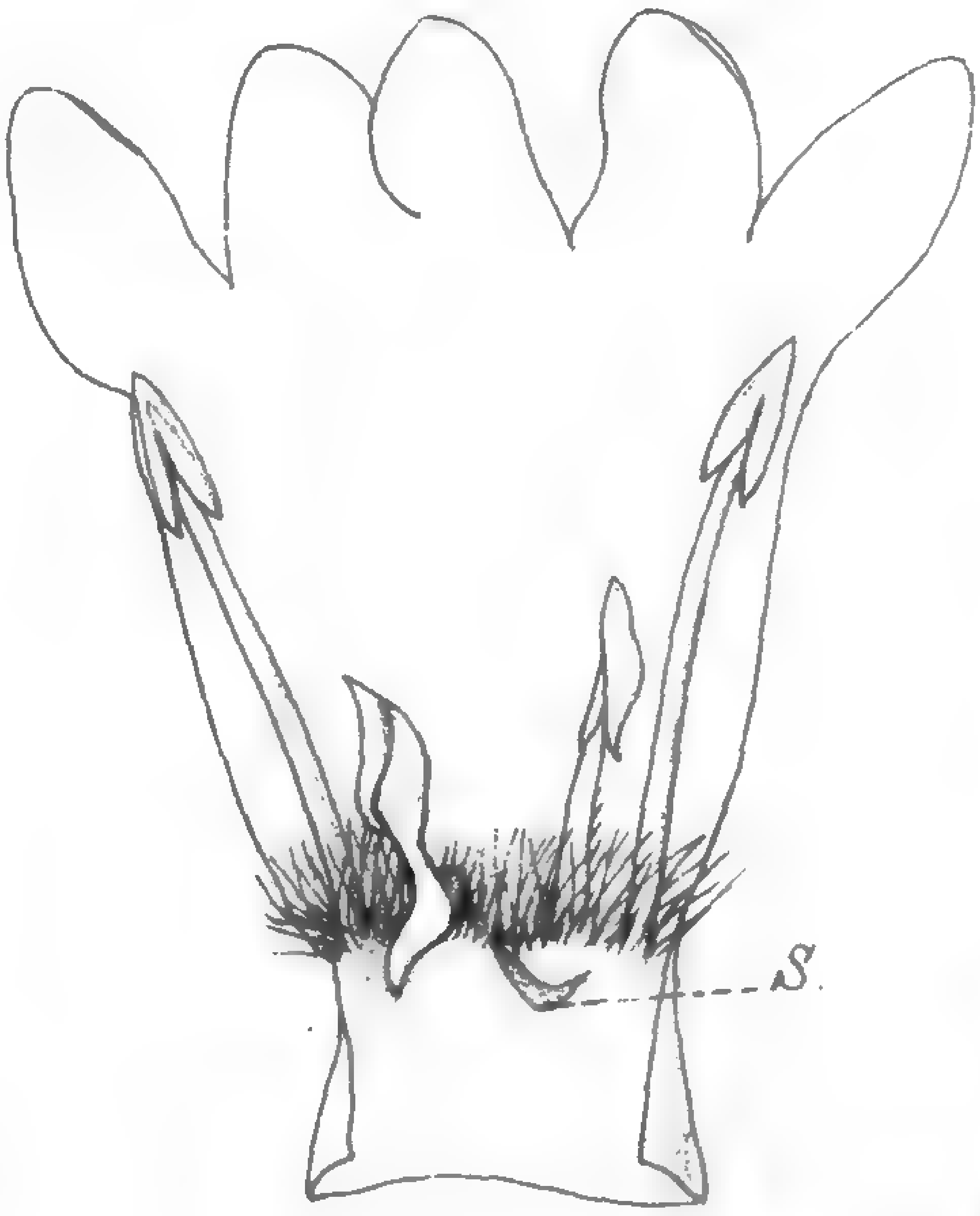

1.


2.

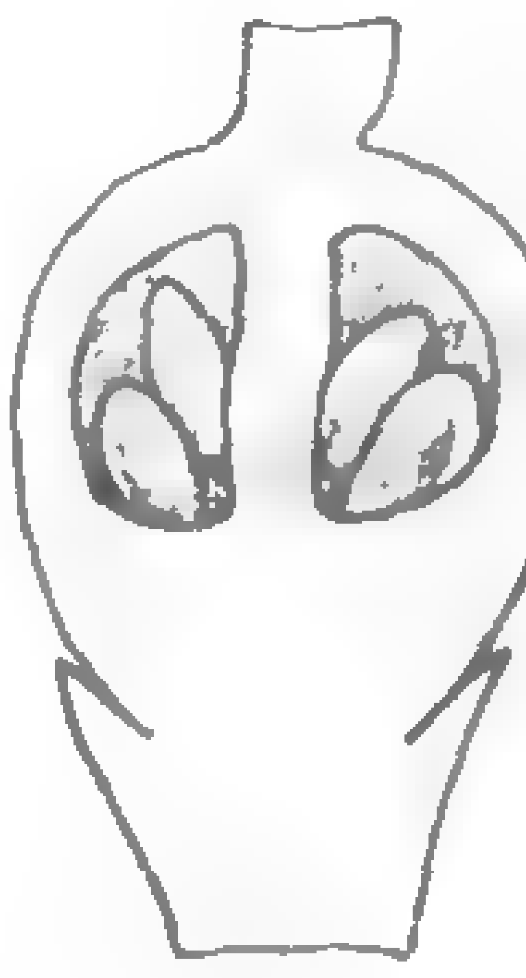

3.

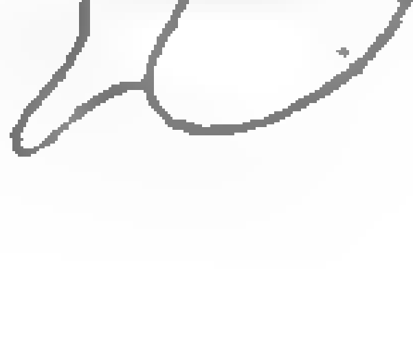


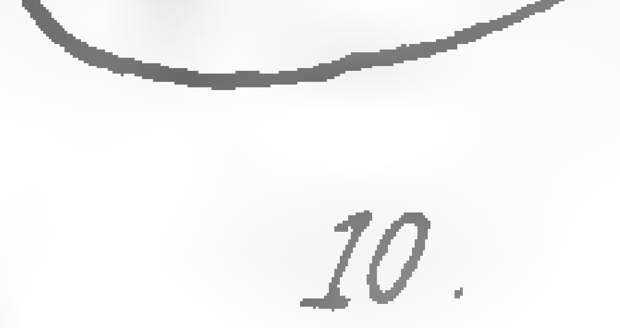
5.

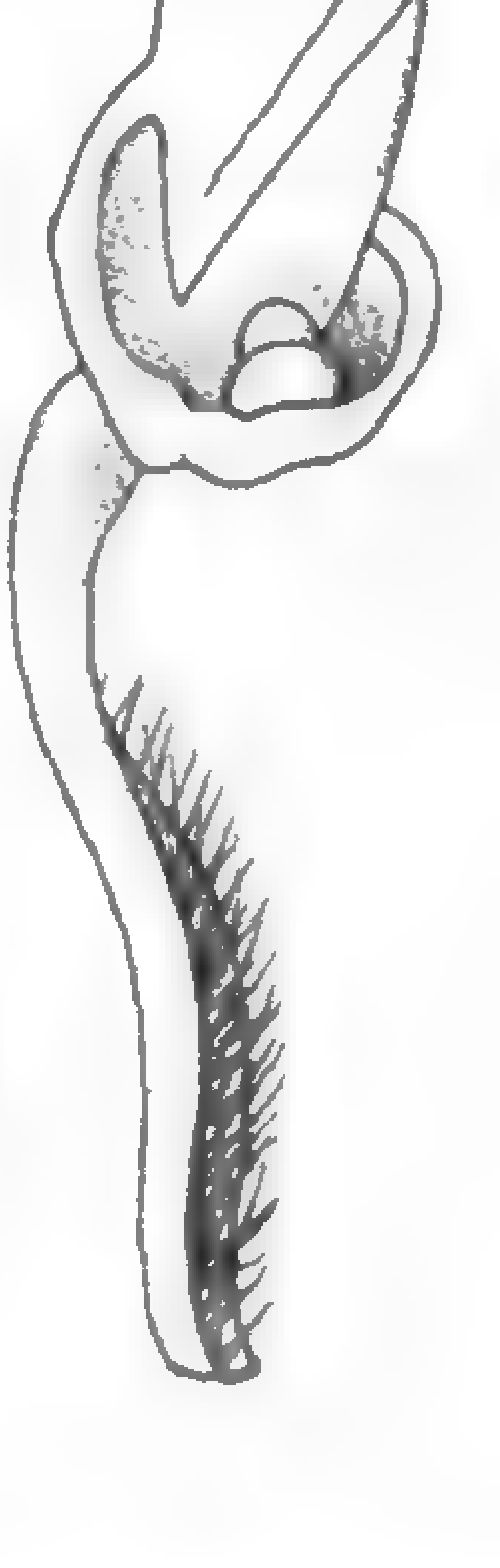


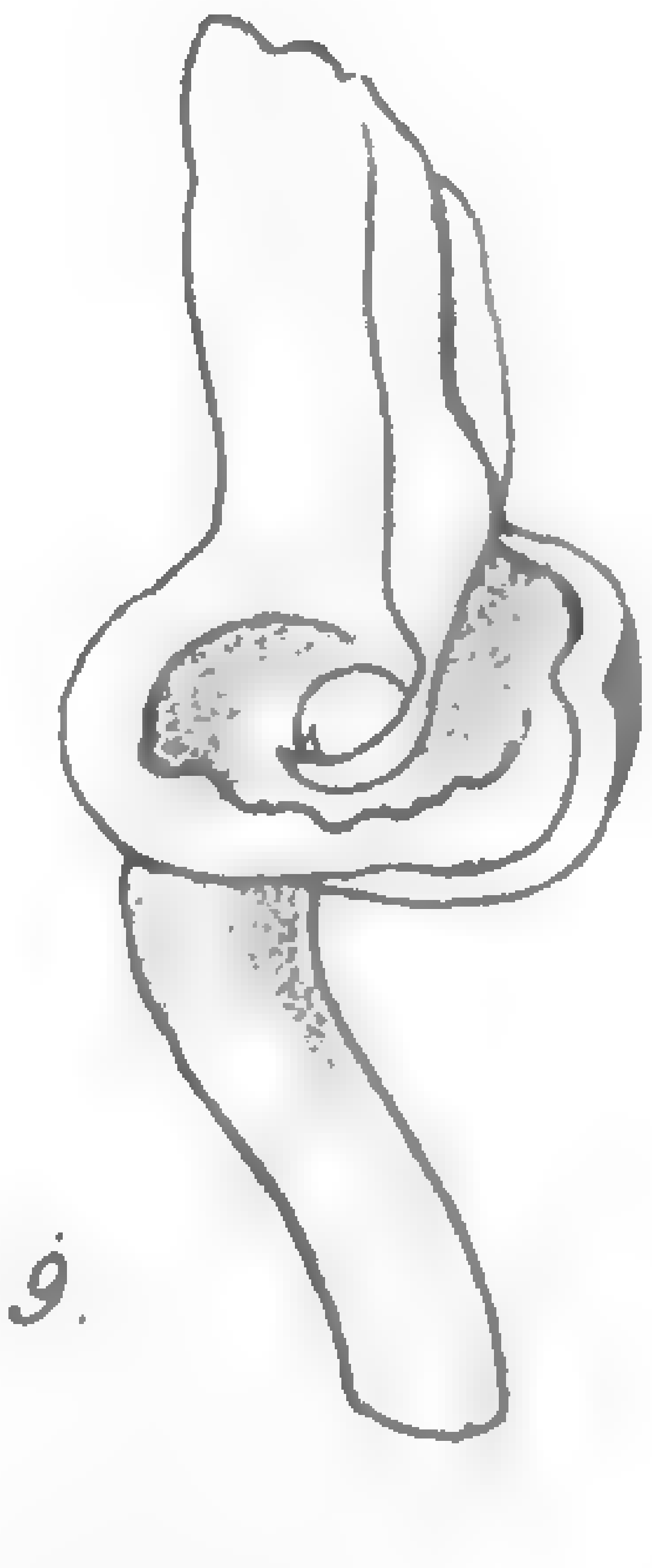
7.

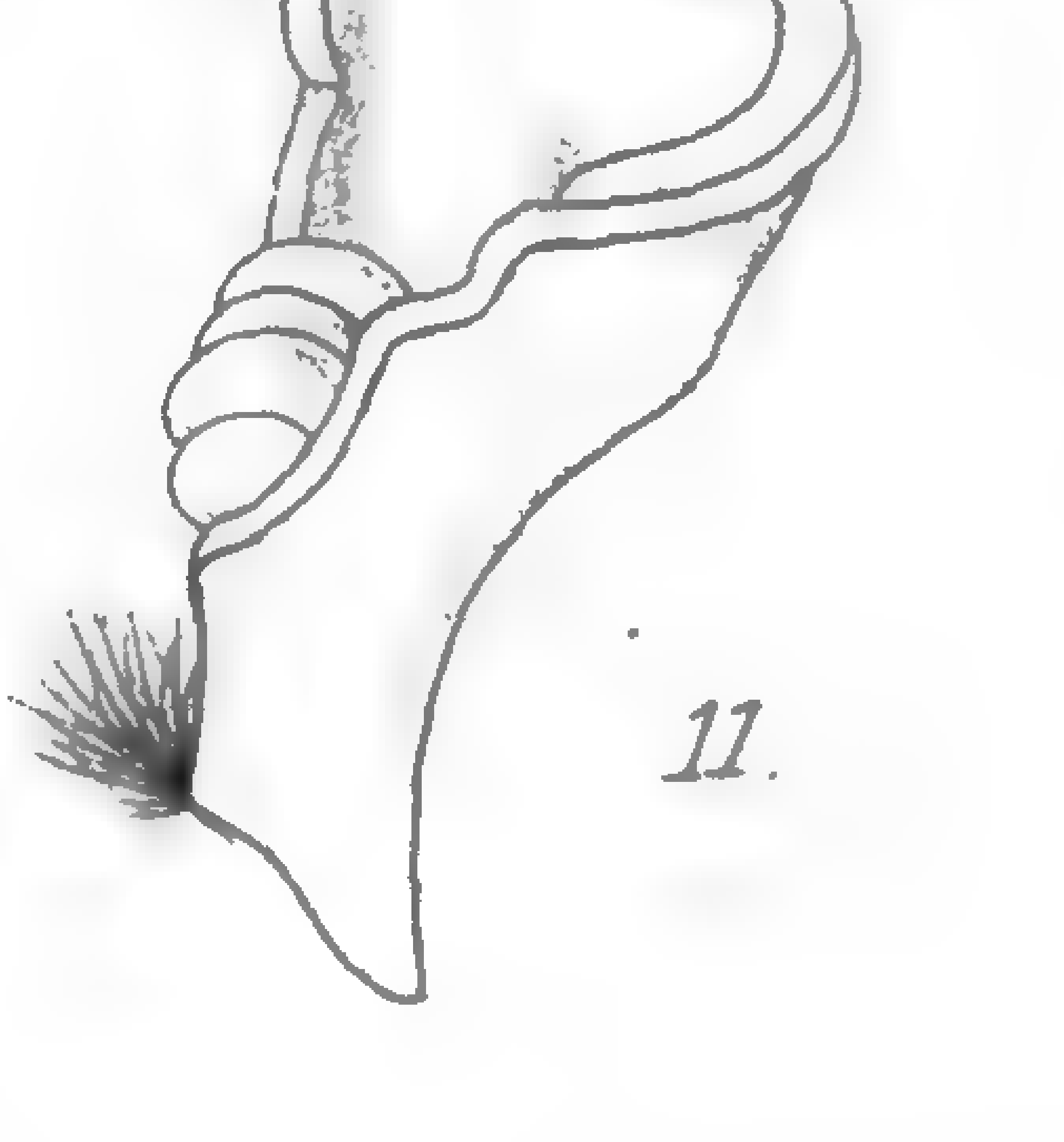

4.


6.


10.

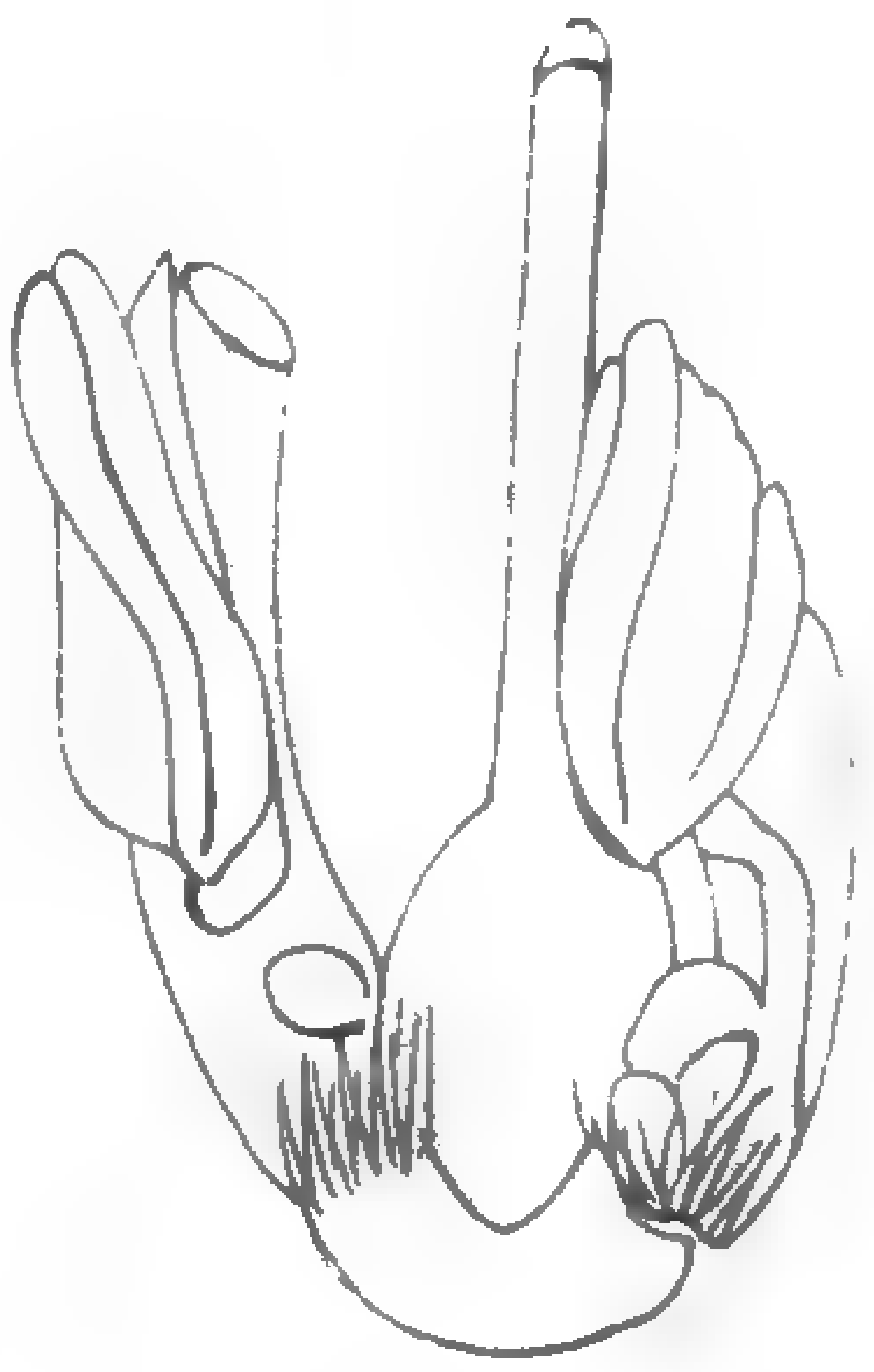

8.


9.

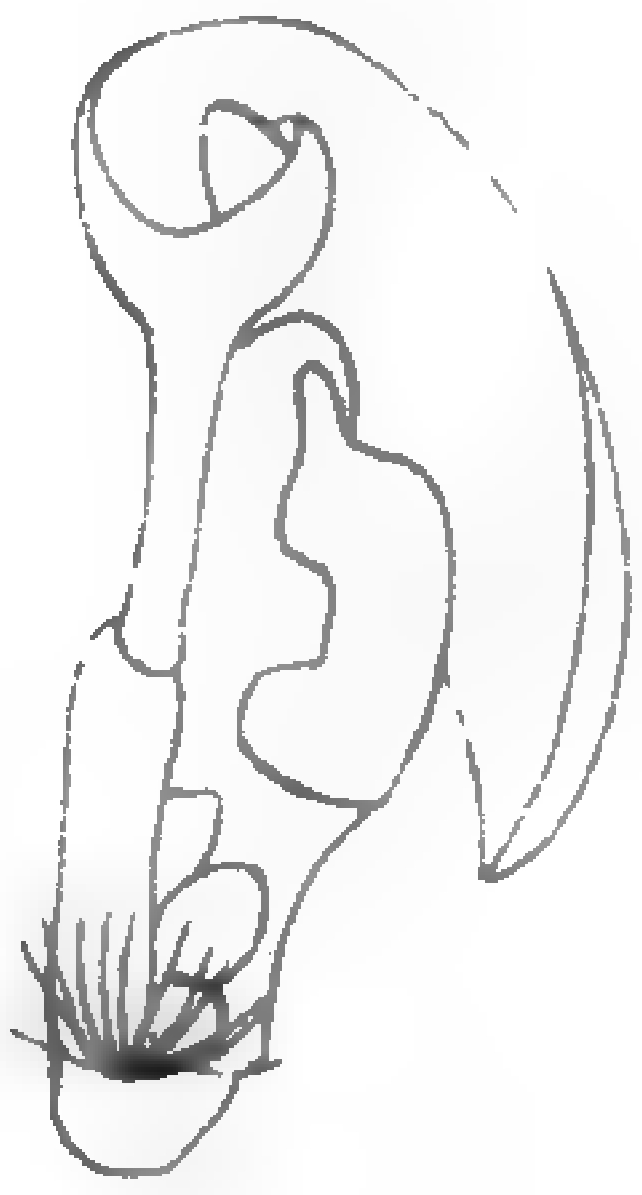


11.

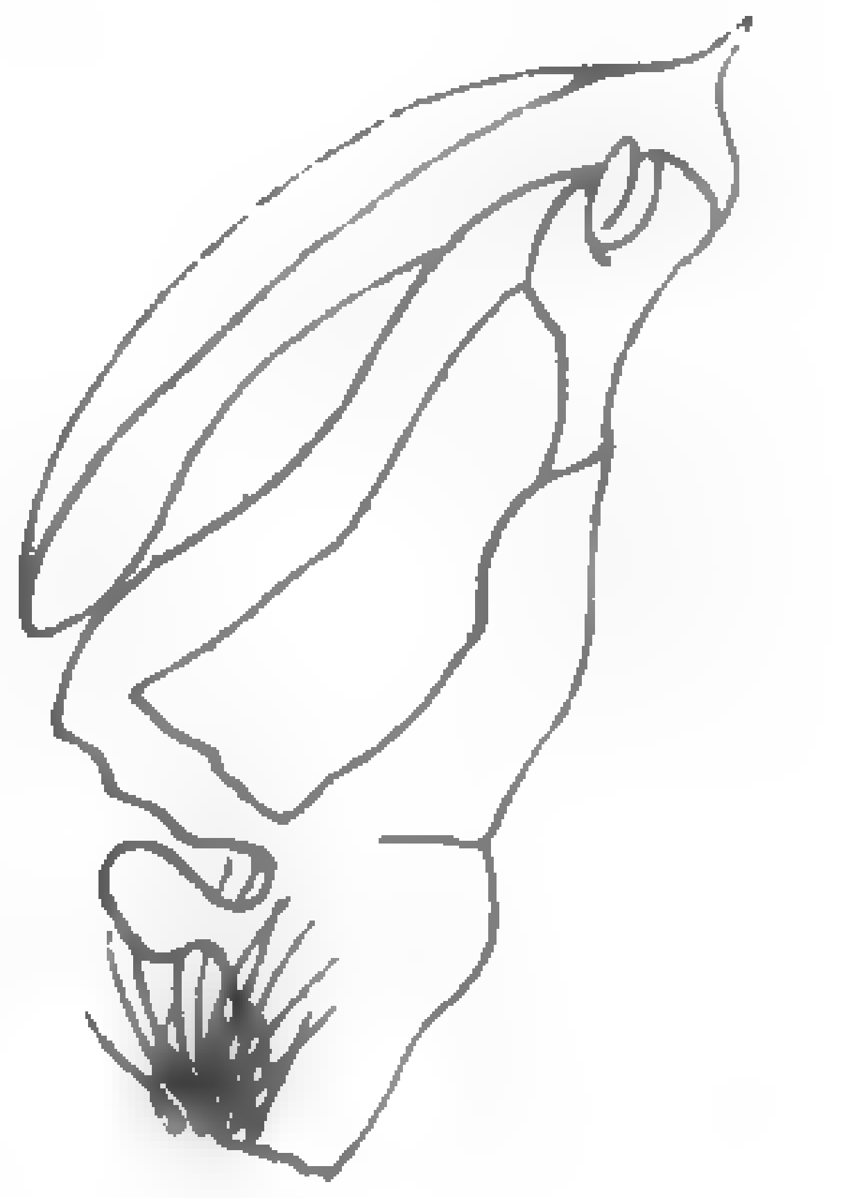
S. L. M. Moore, del.
J. N. Fitch, lith. et imp.



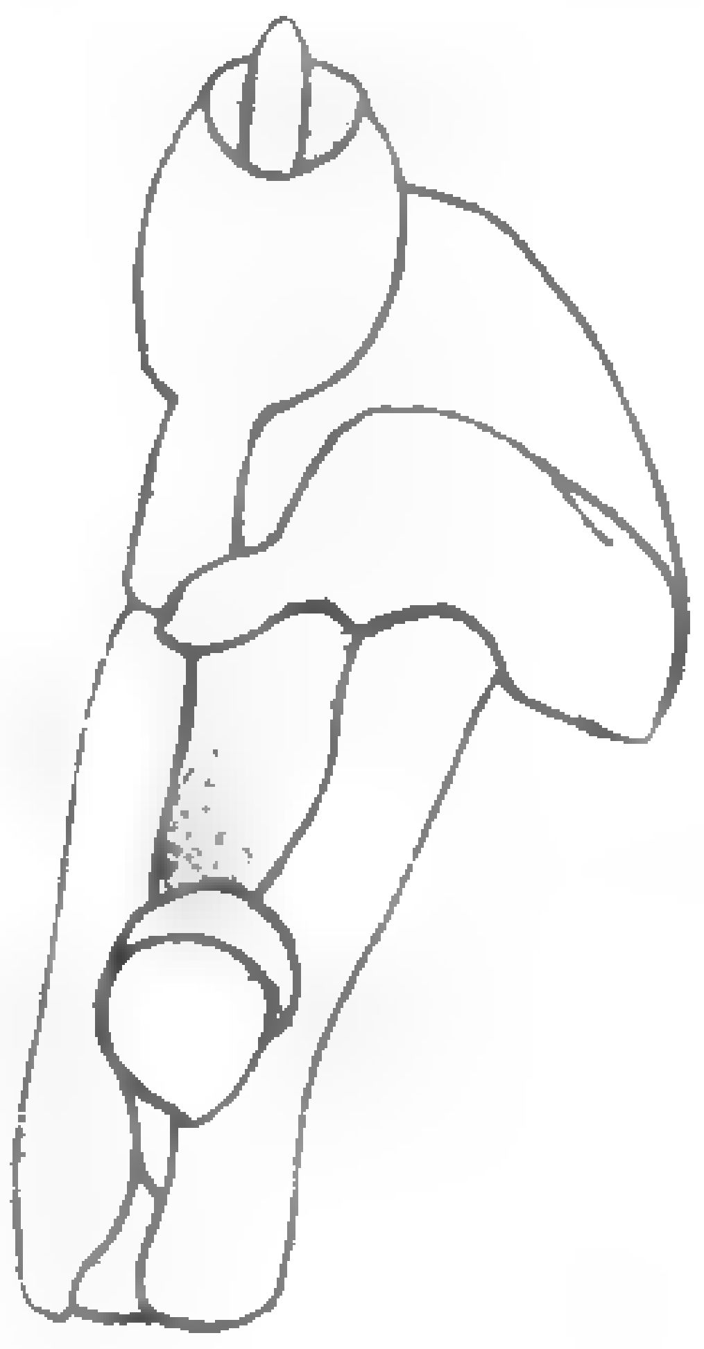
12.



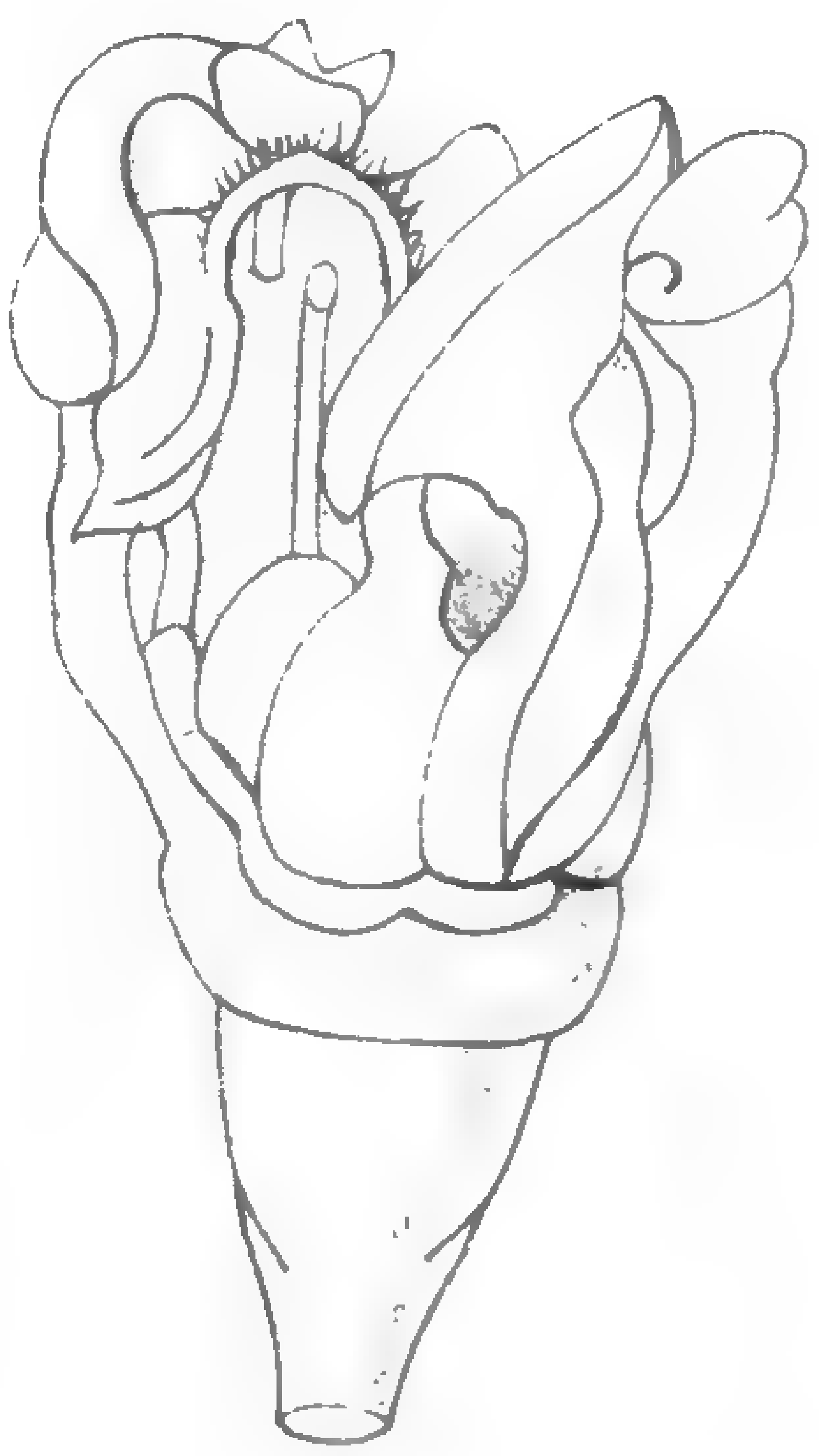
13.



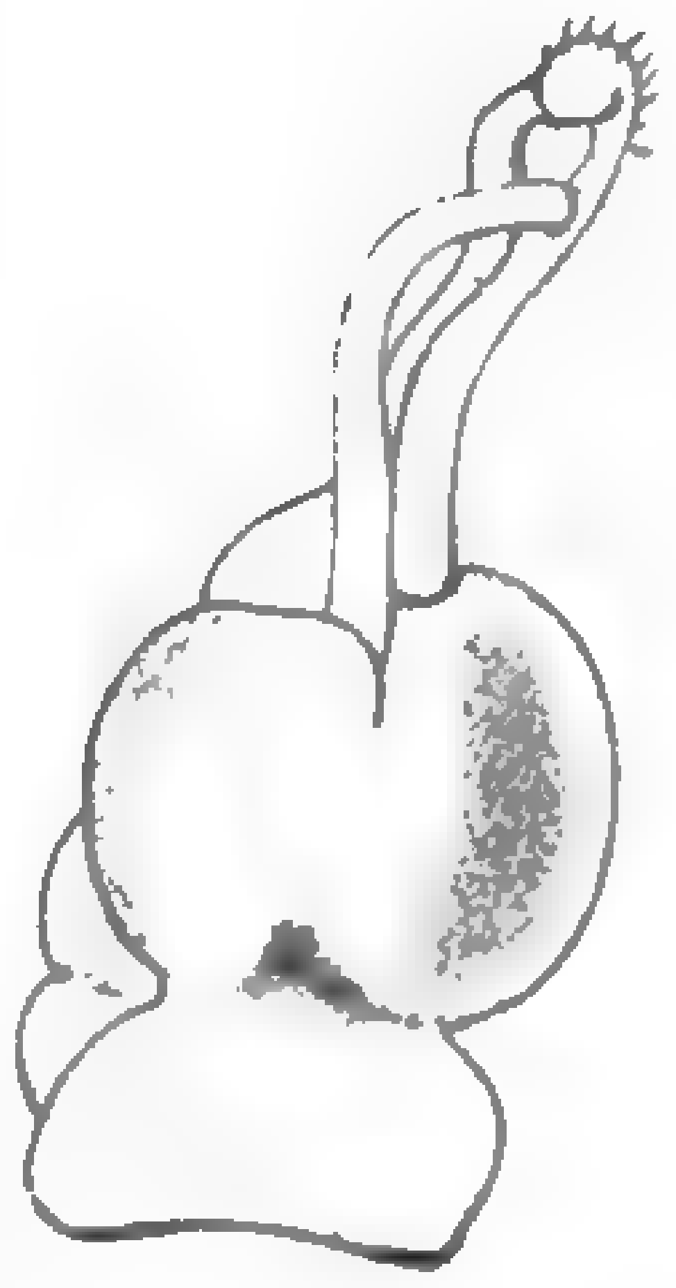
14.



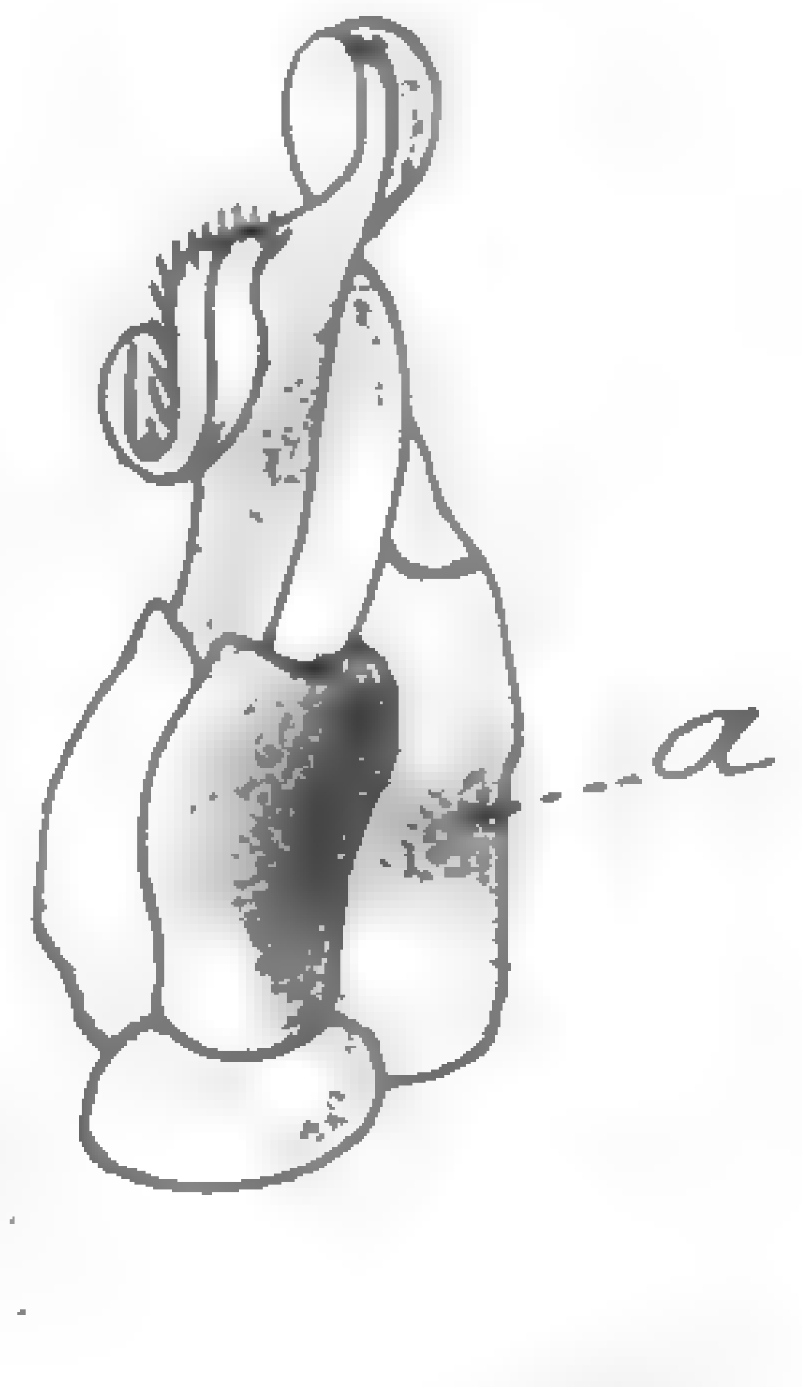
16.



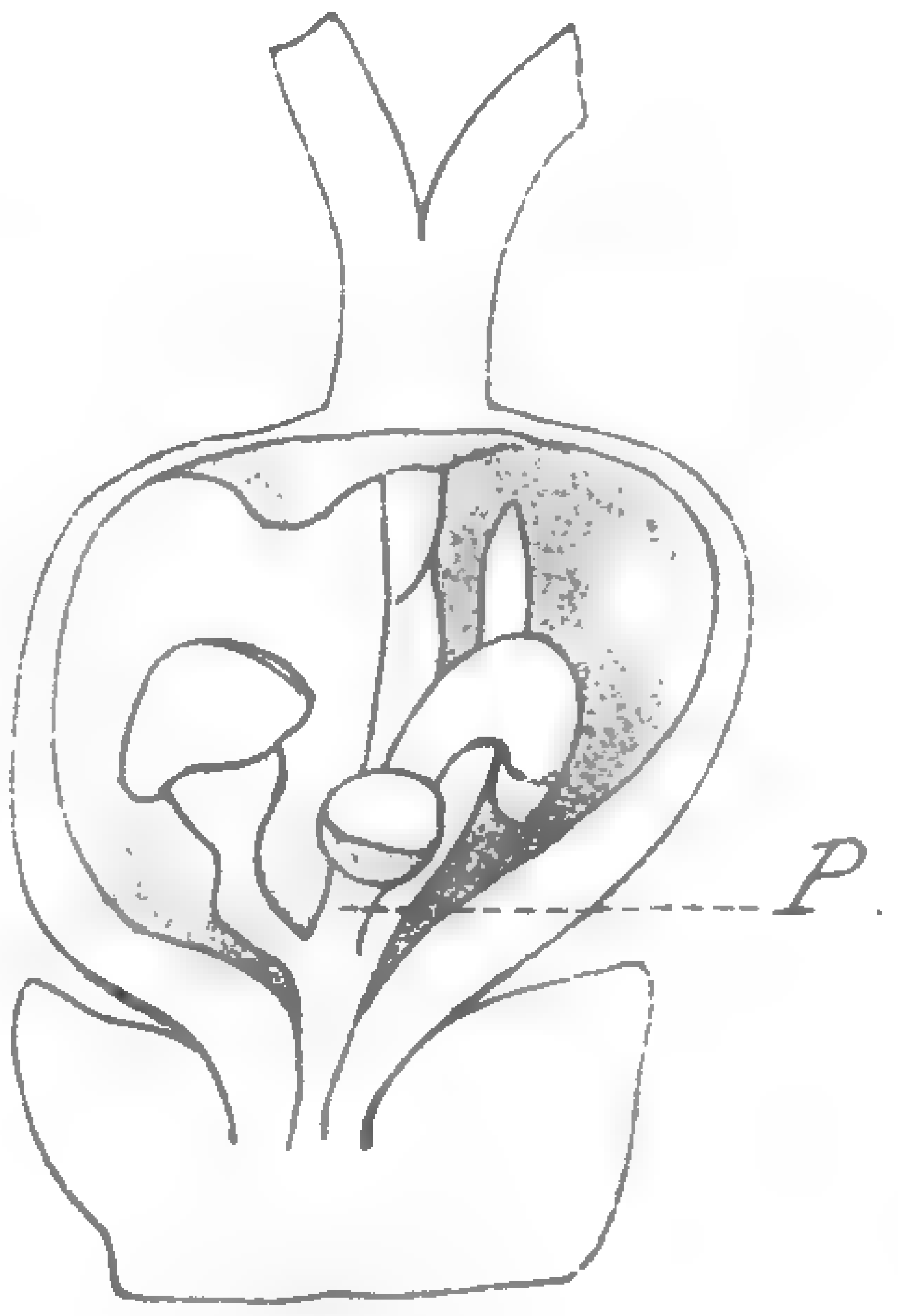
15.



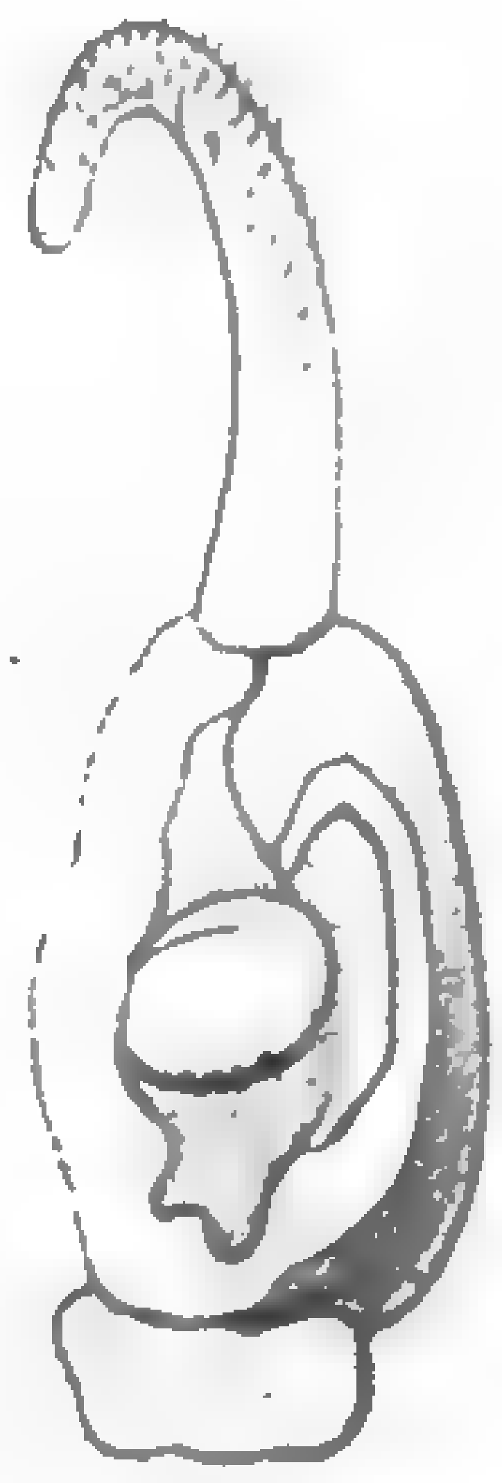
17.



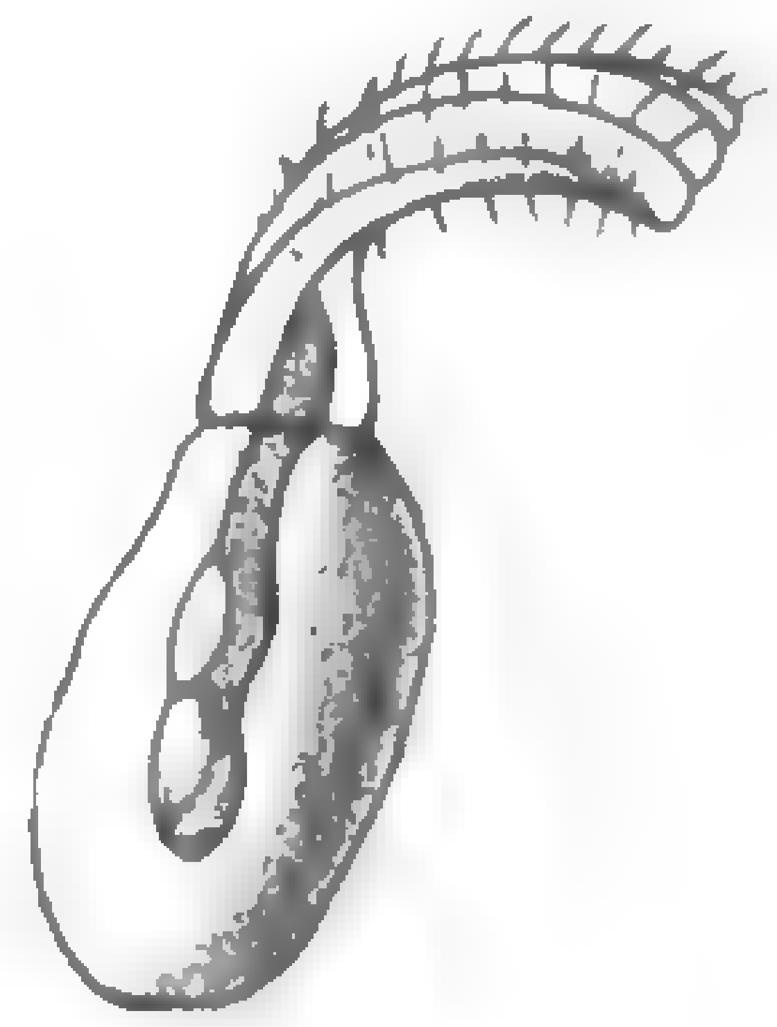
21.



19.



18.



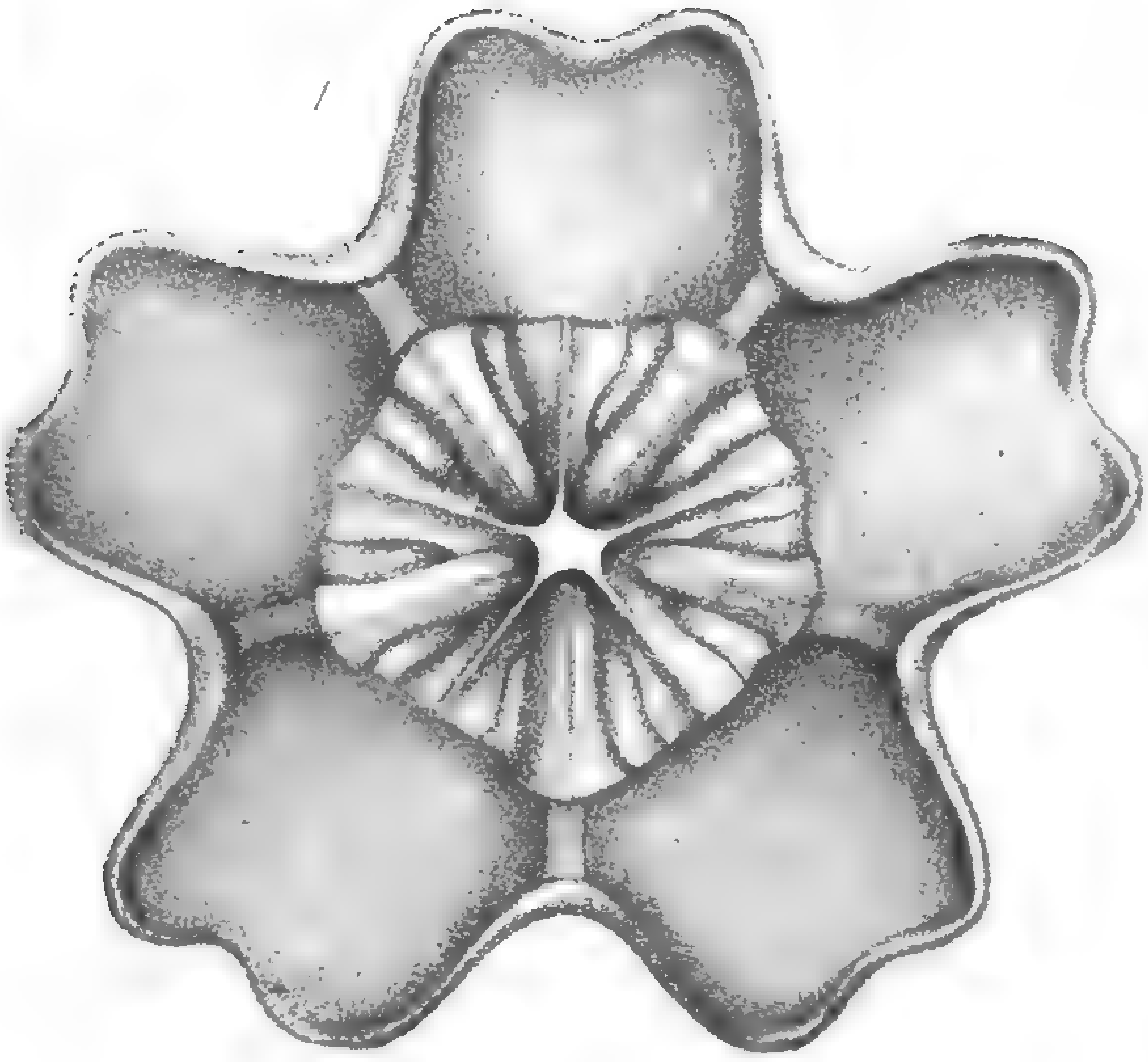
20

S.L.M. Moore, del.

J.N. Fitch, lith. et imp

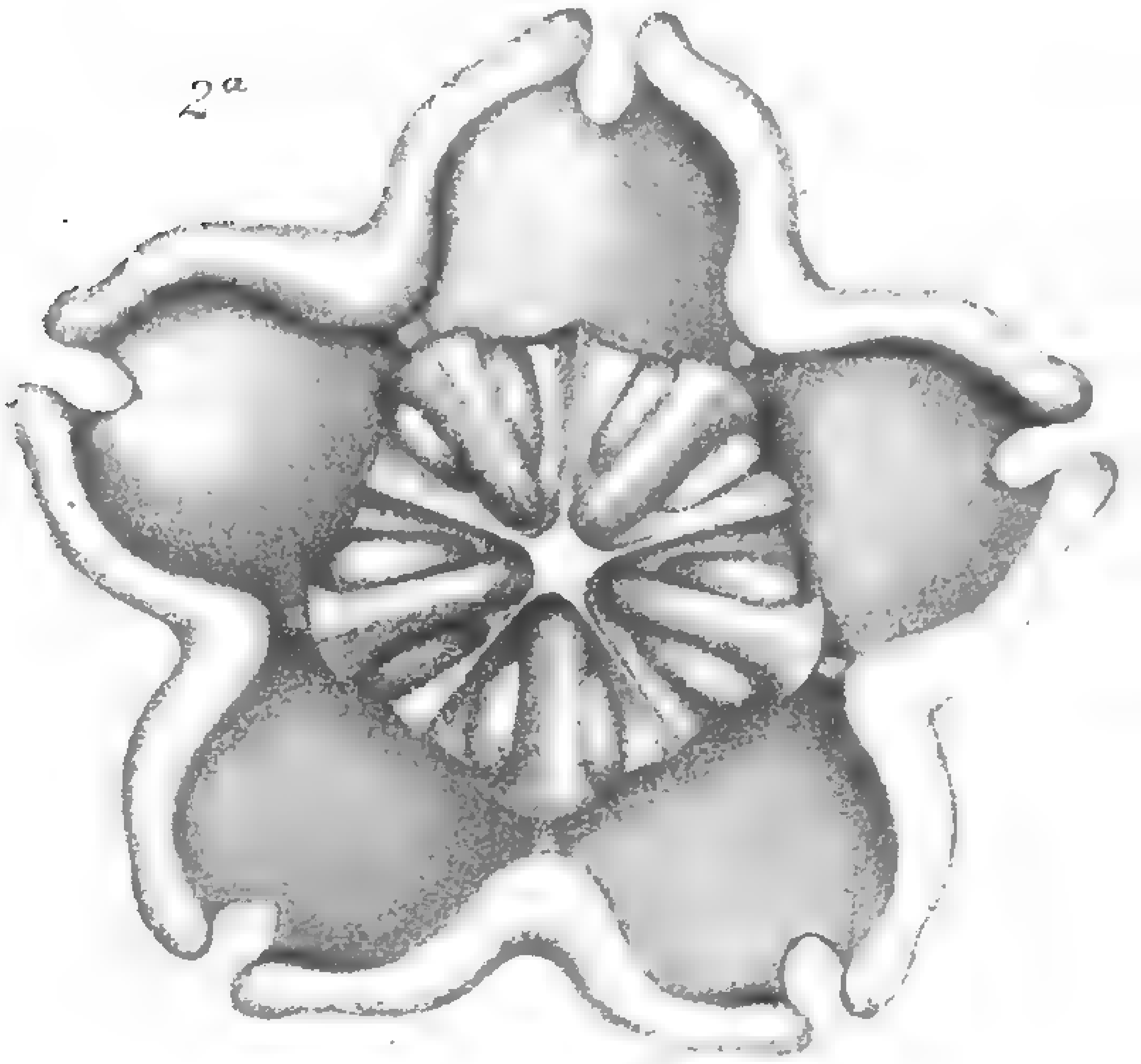
W.T.T. Dyer del

LINN SOC. JOURN BOT. VOL. XV Pl. 5.

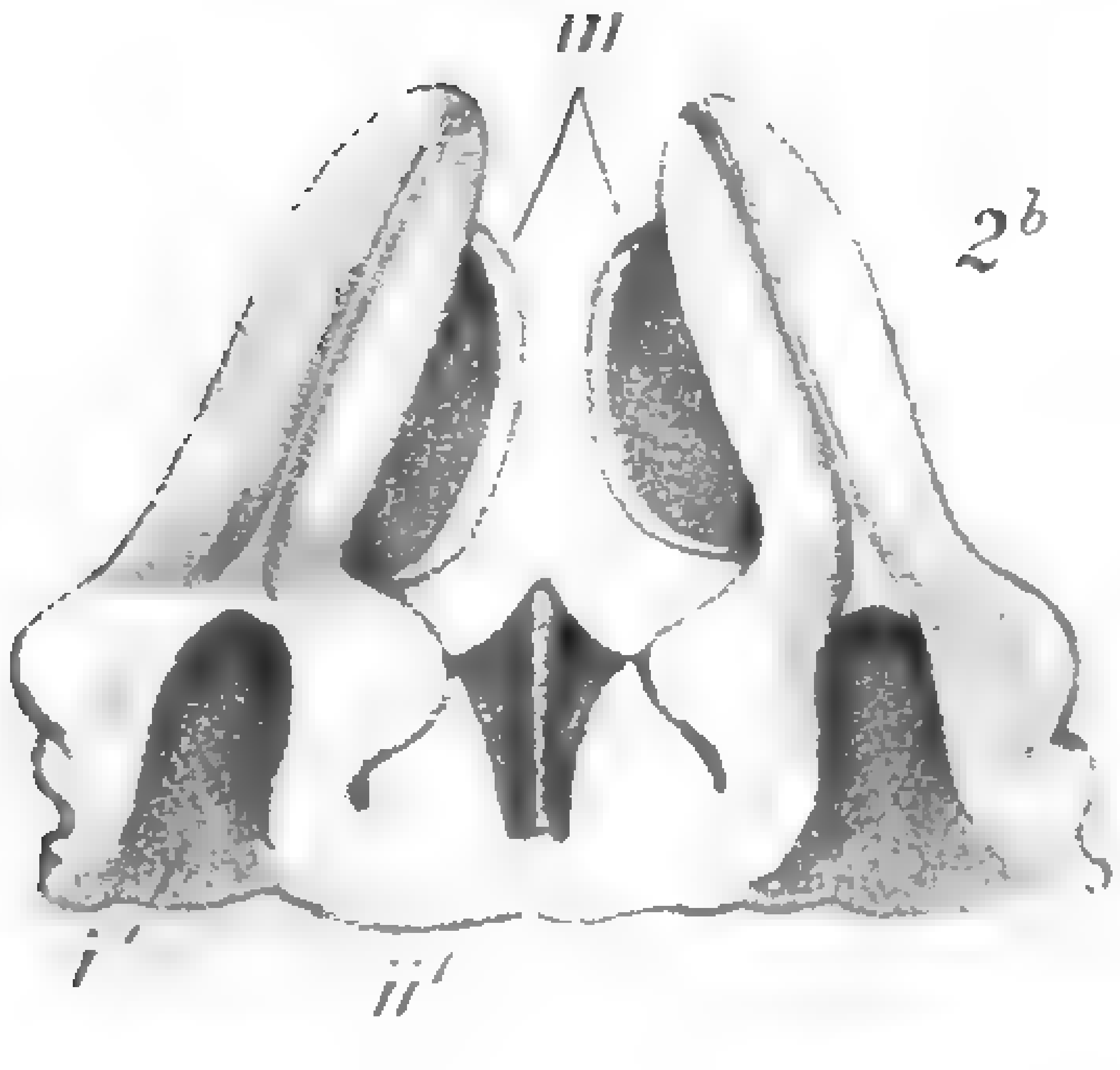


1

H. Gordoni

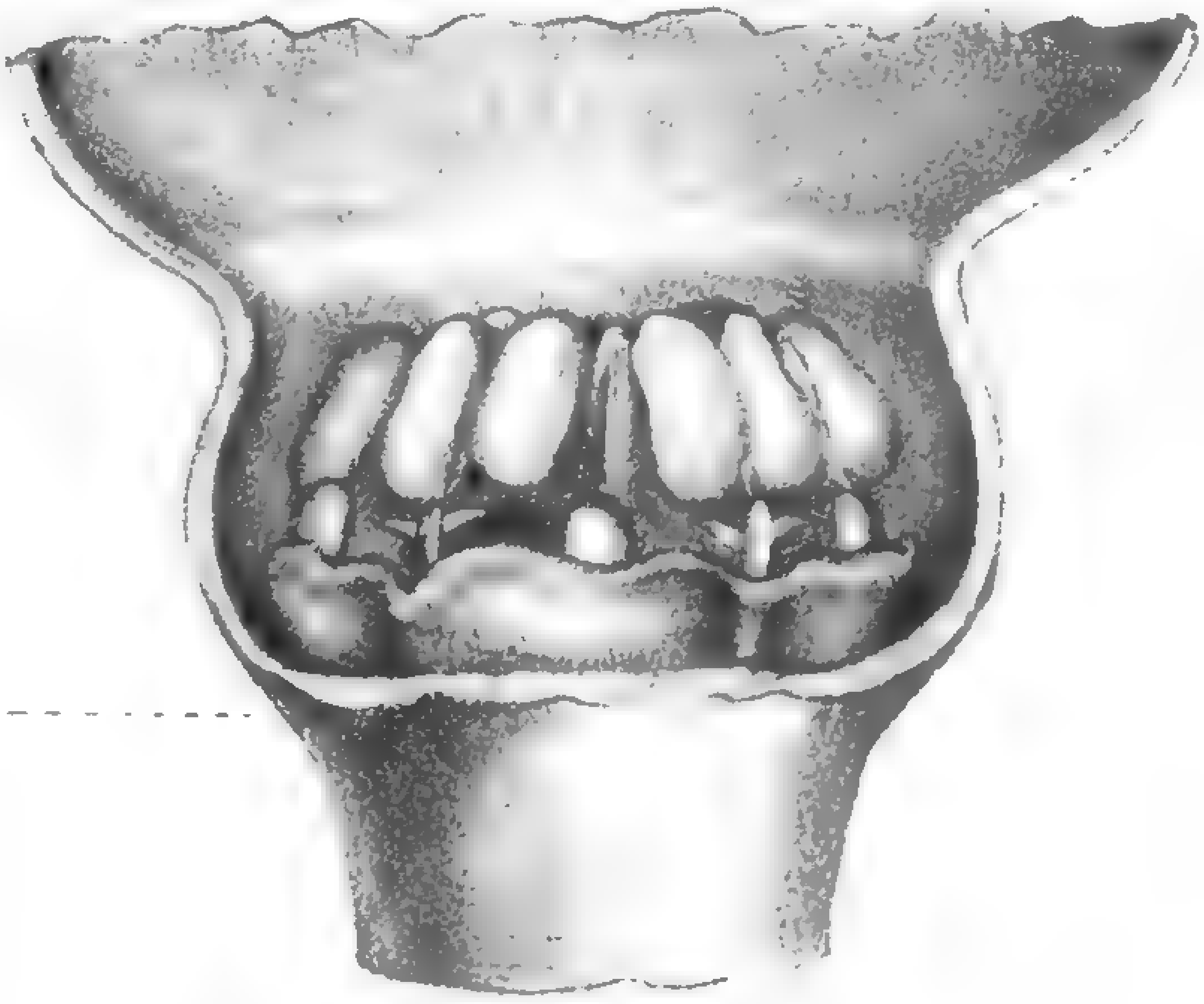


2^a

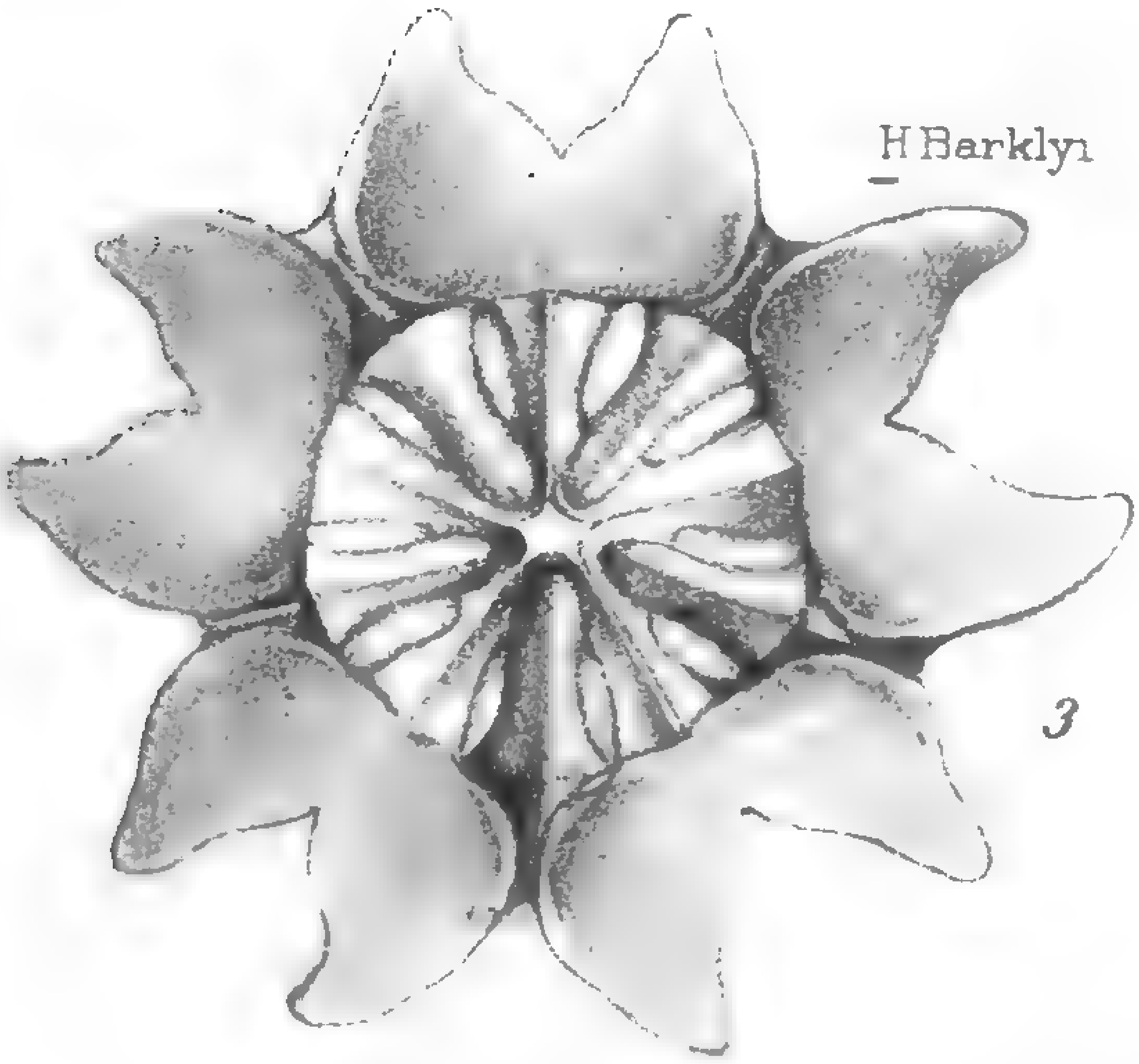


2^b

H. Currori.

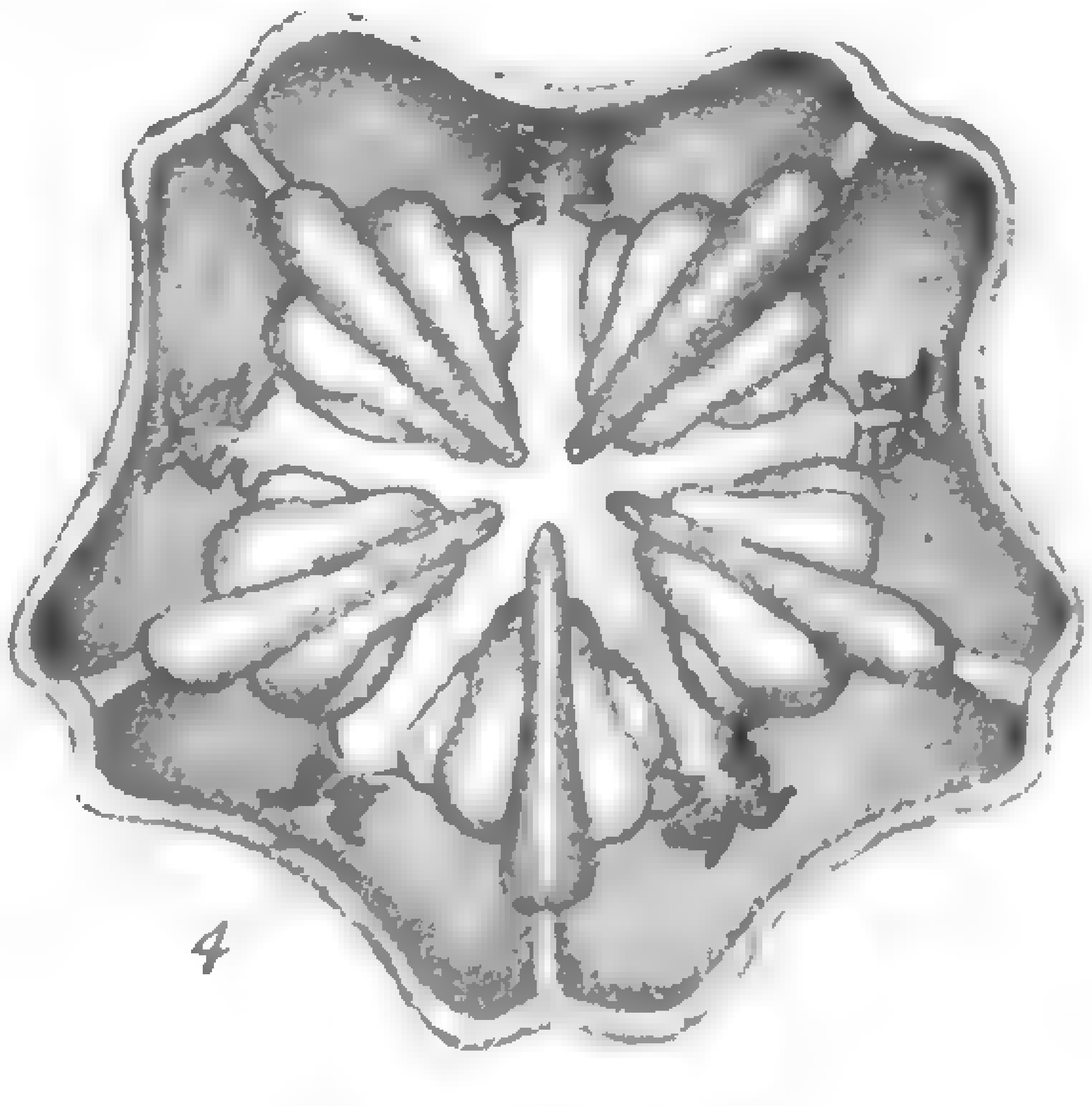


2^c



H Barklyi

3



D Barklyi

4

Berjeau lith

HOODIA & DECABELONE

Hanhart imp

A R Darwin del:

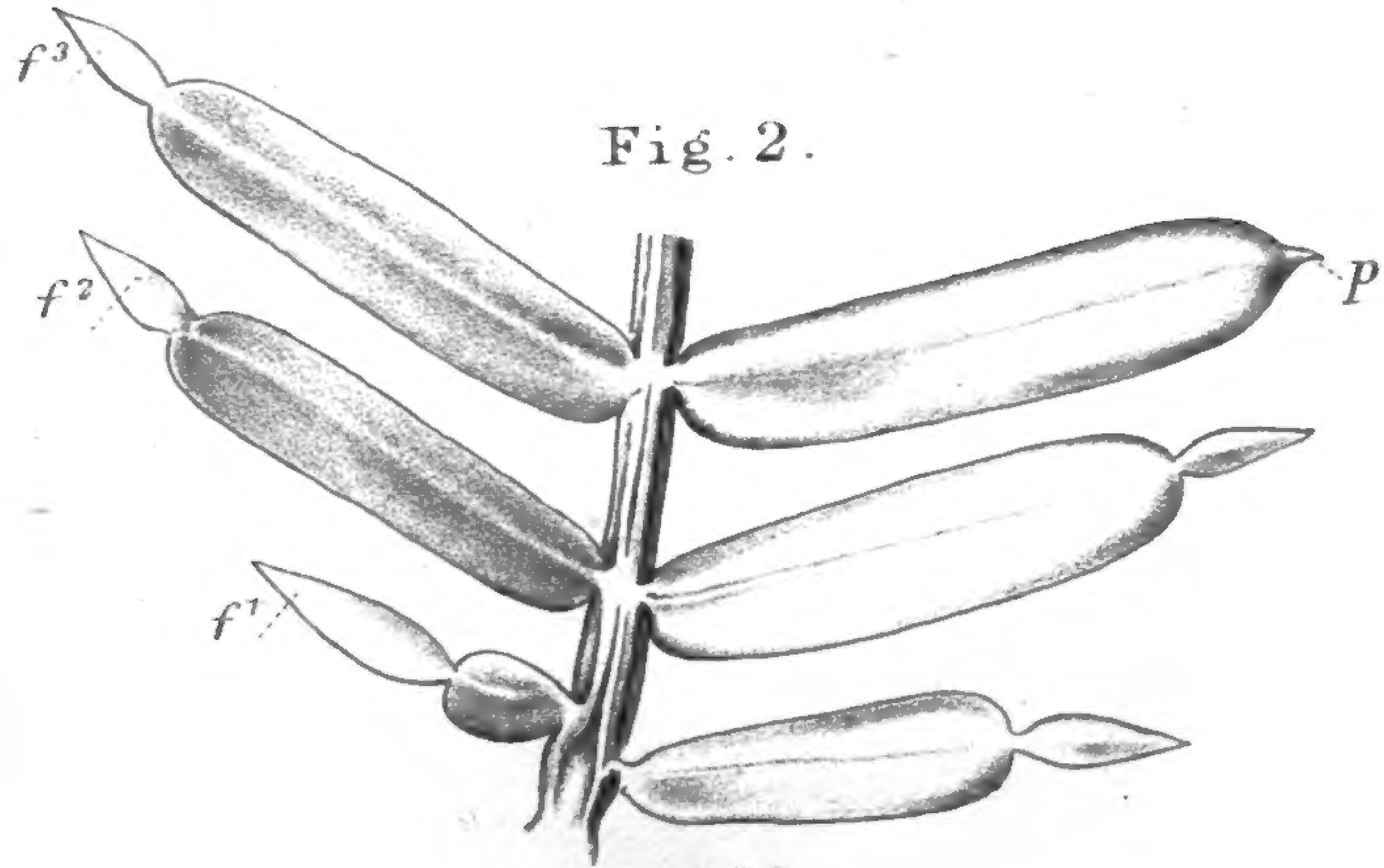

f³
f²
f¹
p
X 5·7

Fig. 2.

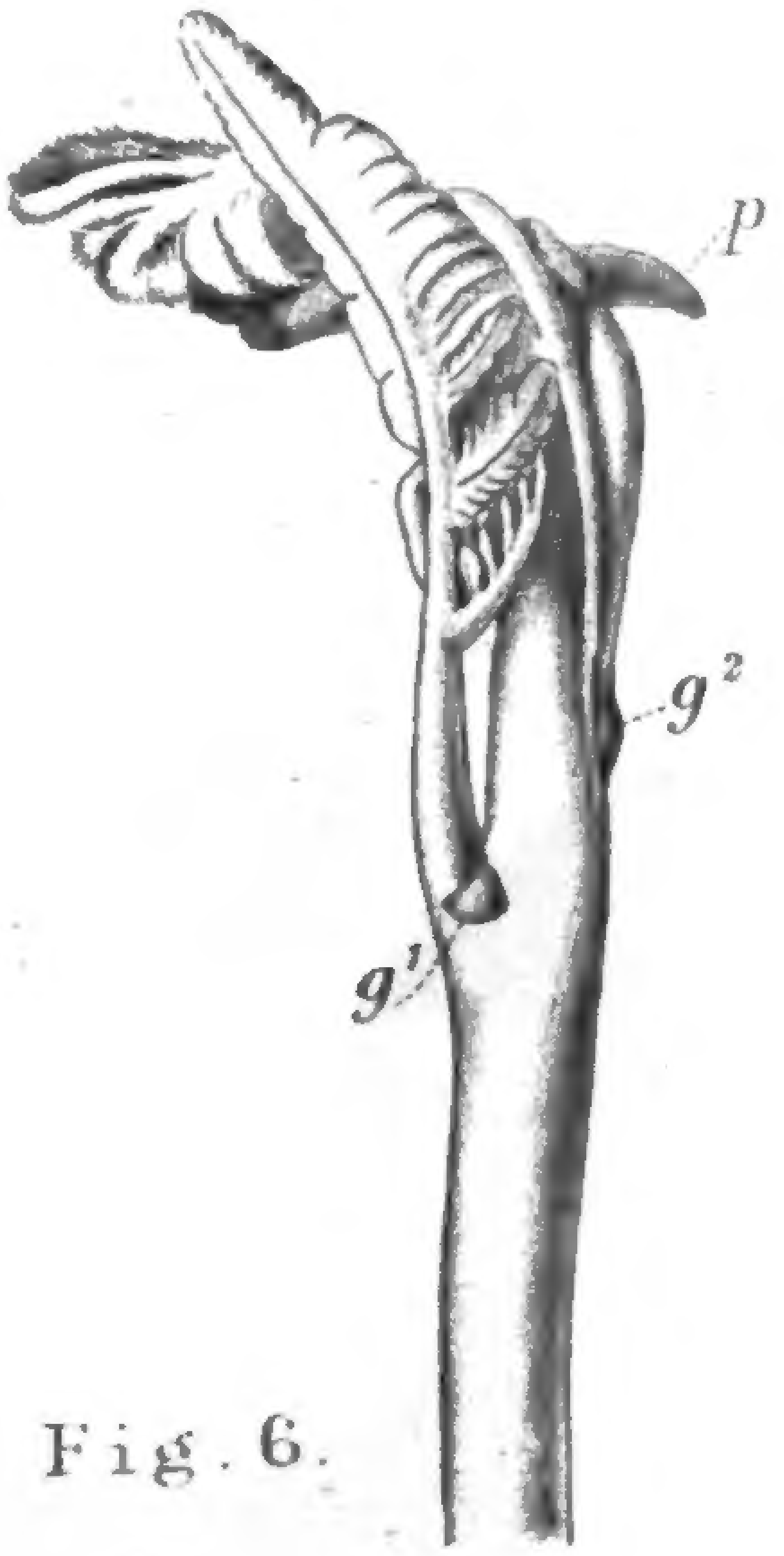


Fig. 6.

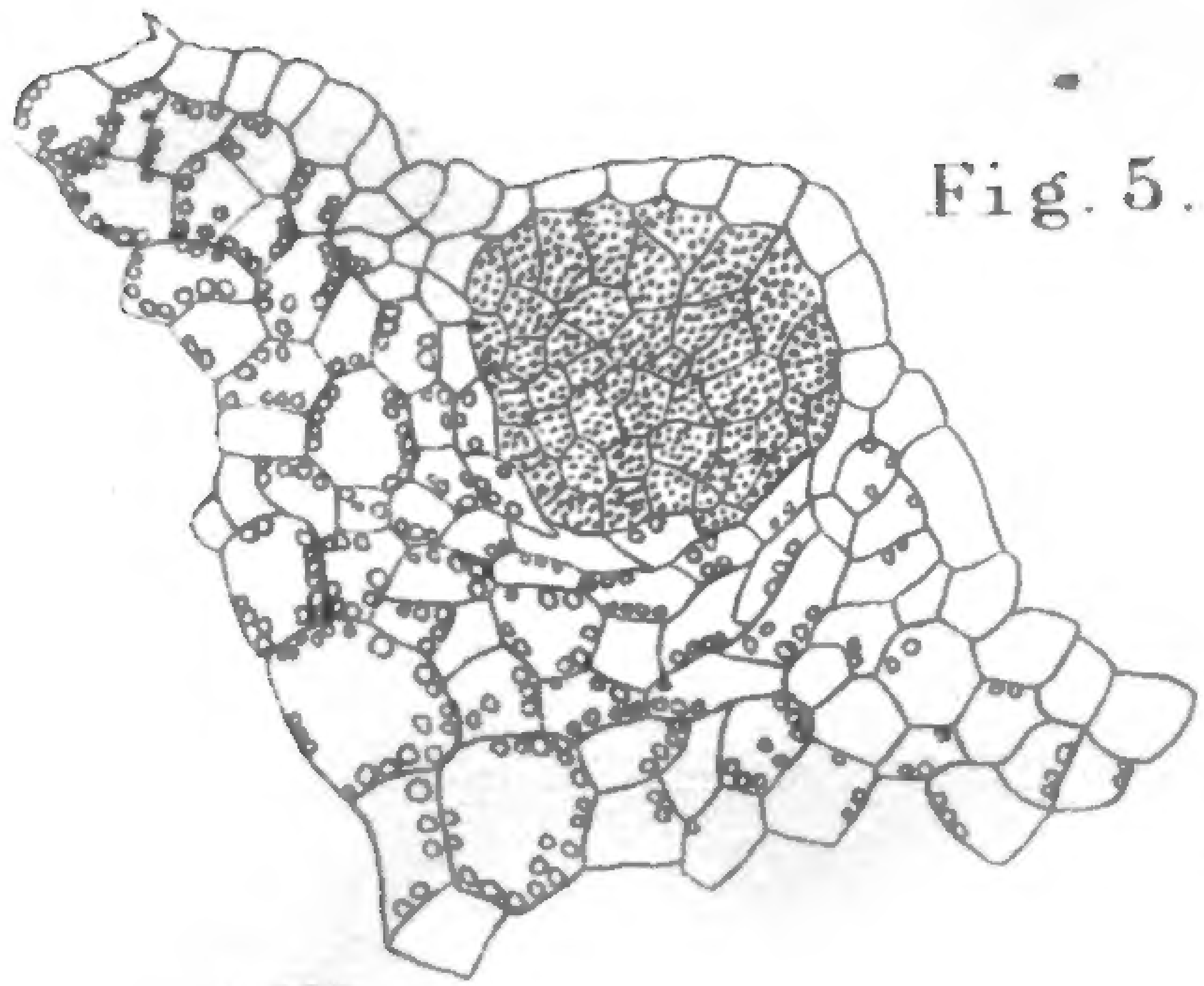


Fig. 5.

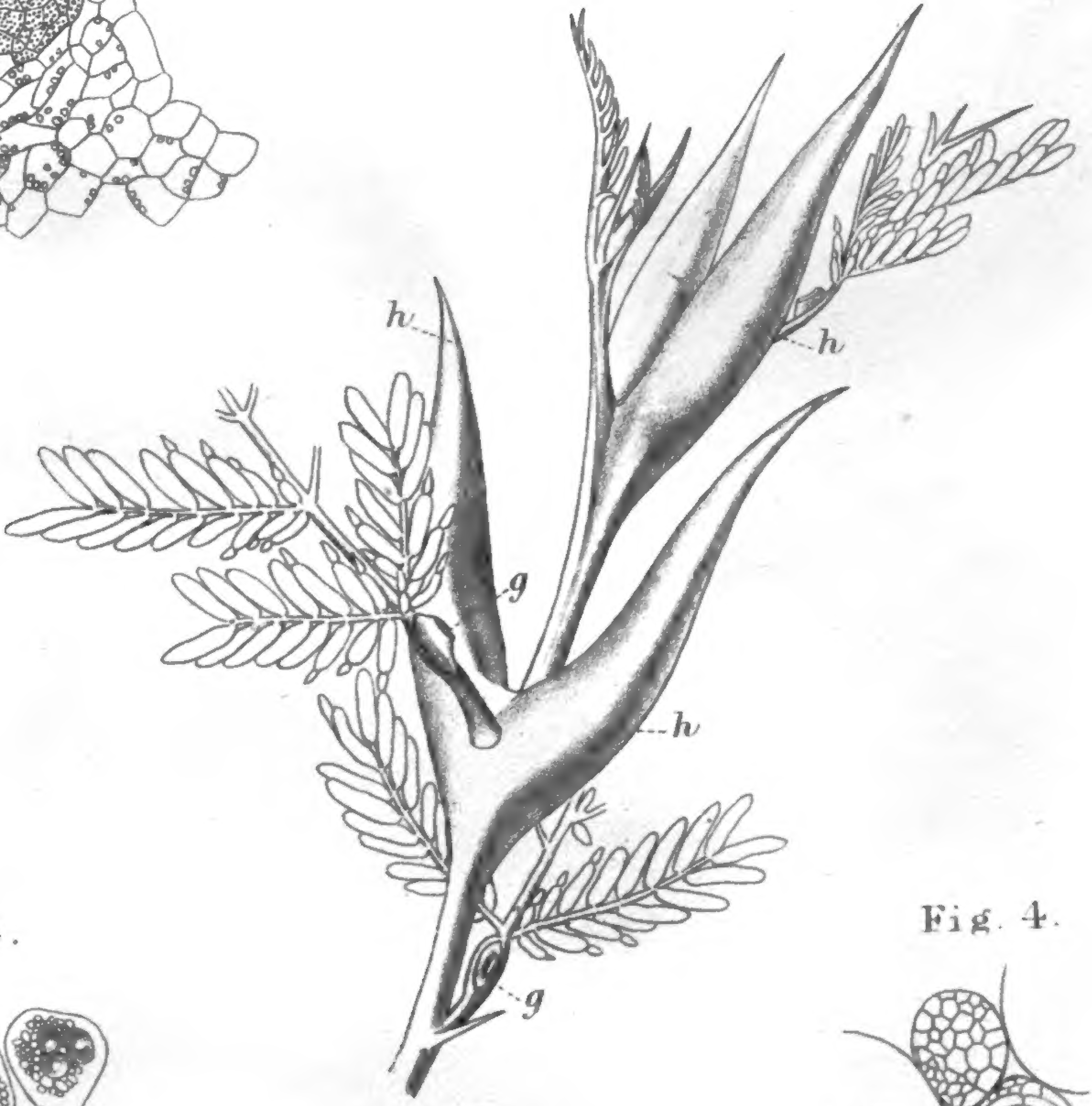


Fig. 1.

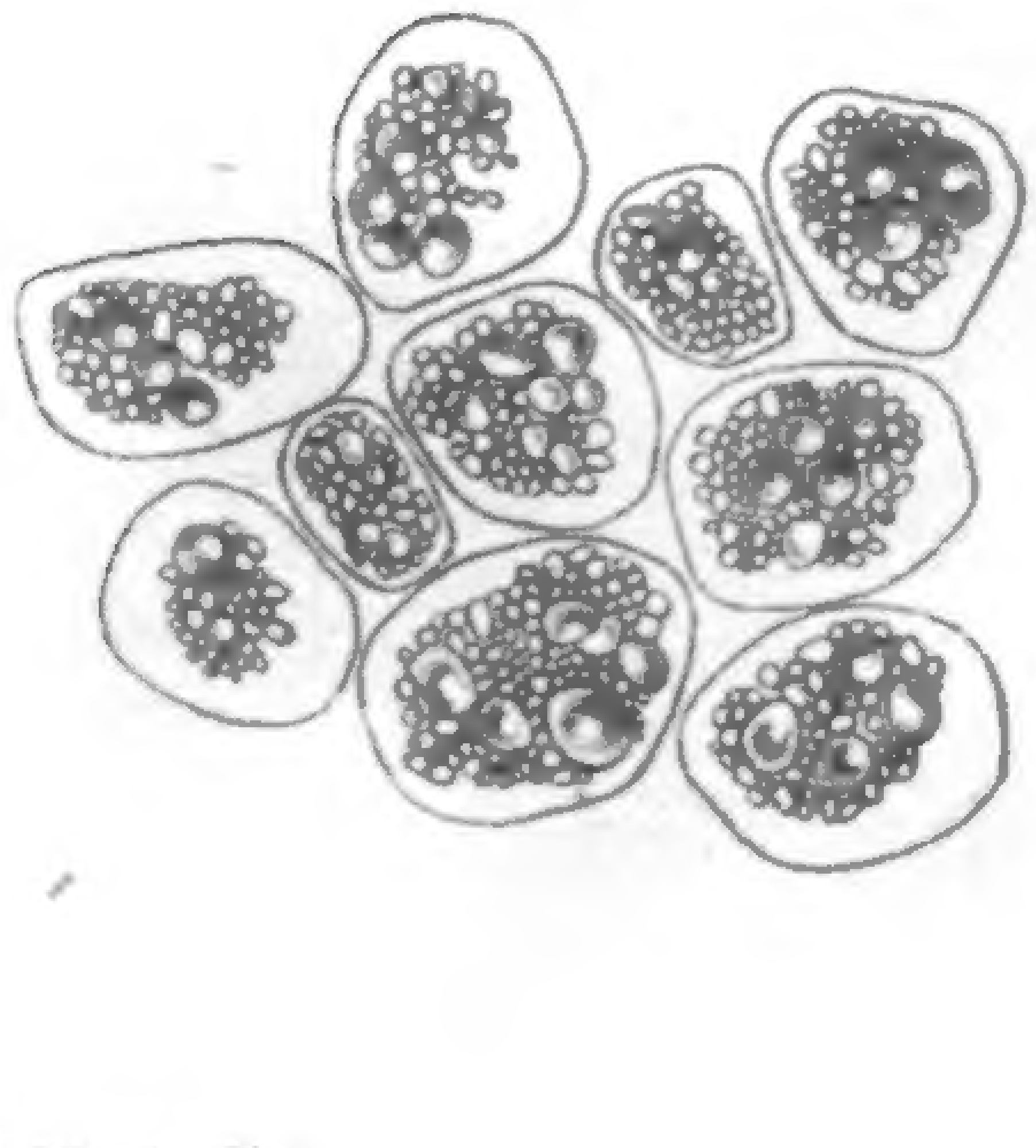


Fig. 3.

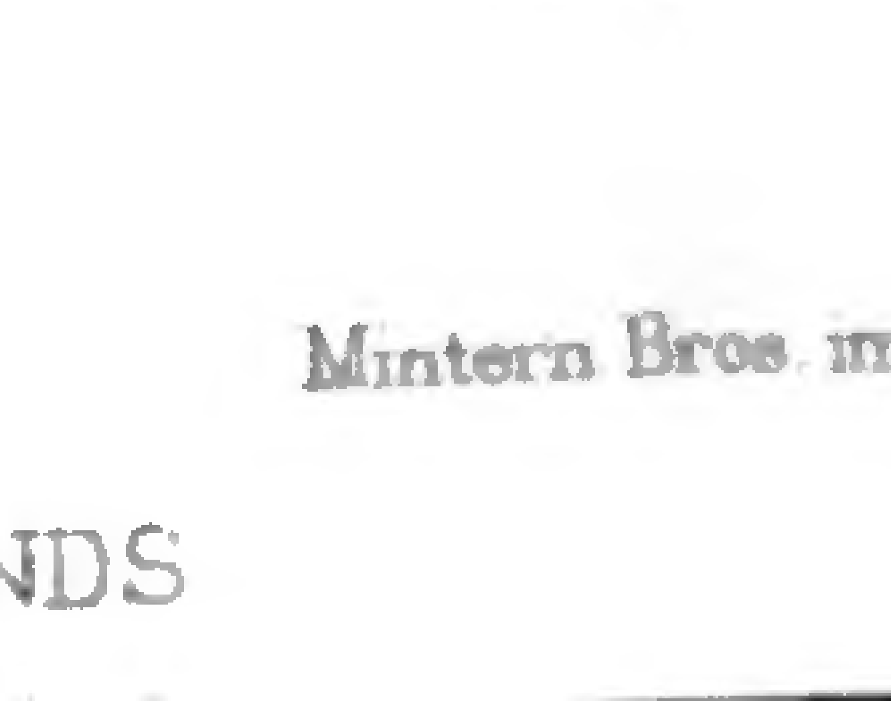


Fig. 4.

D. Blair lith

Mintern Bros. imp.

GLANDULAR BODIES & NECTAR GLANDS

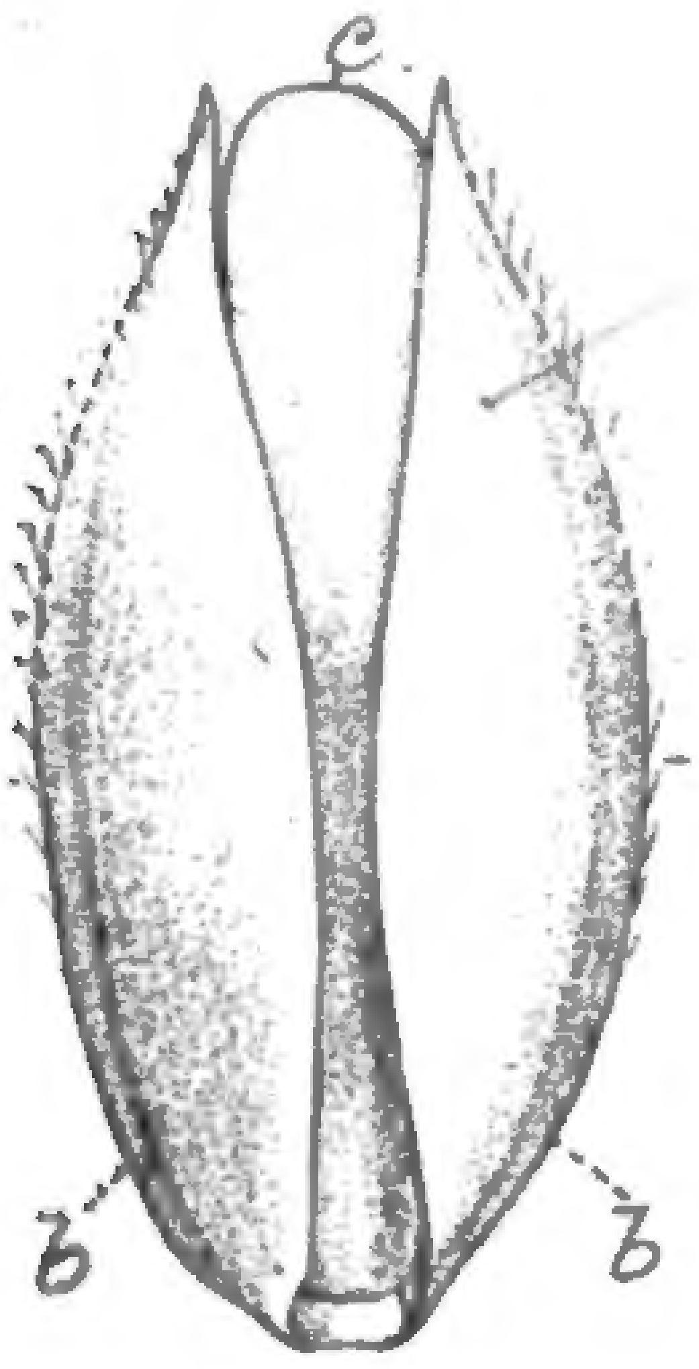


Fig. 1

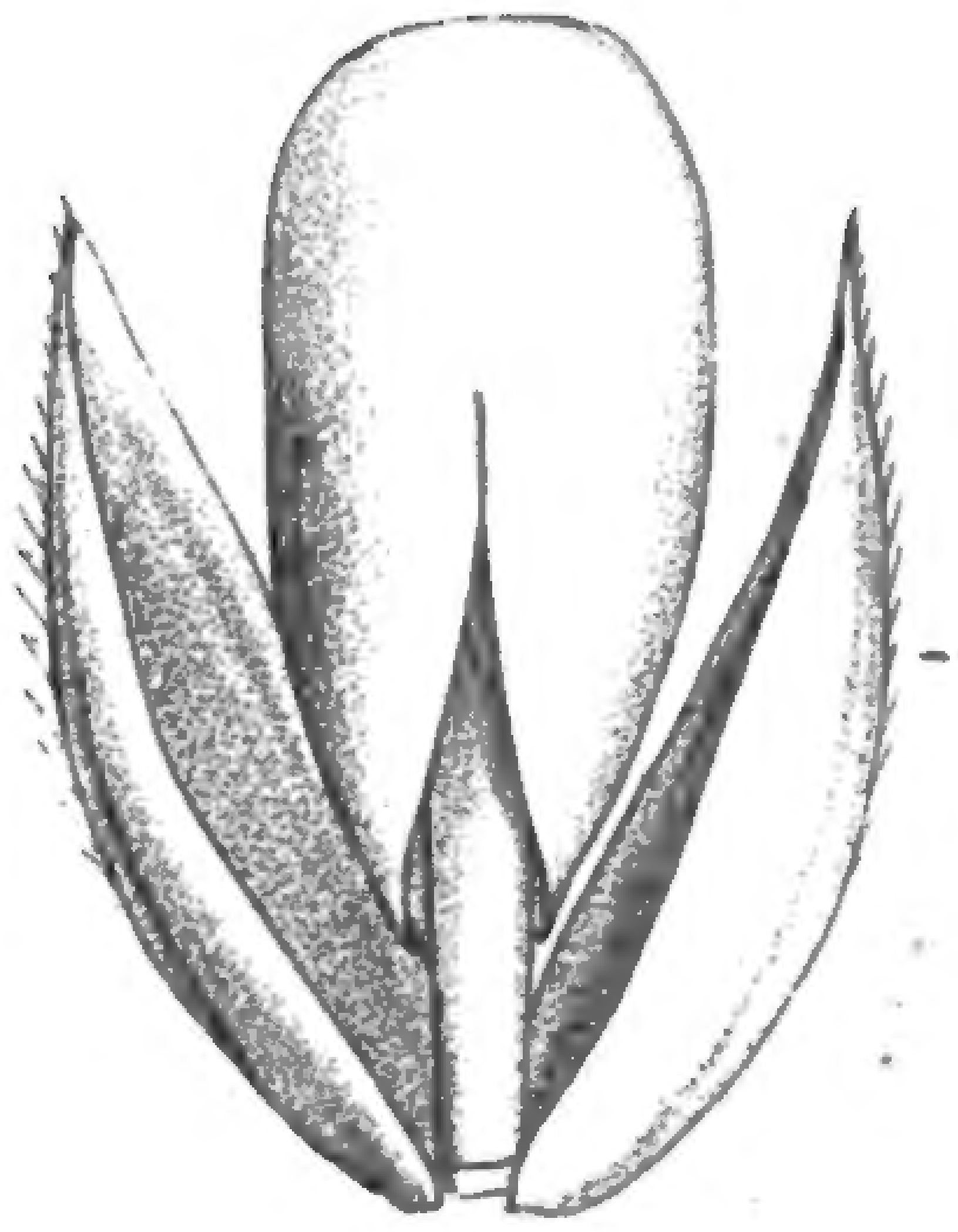


Fig. 2.

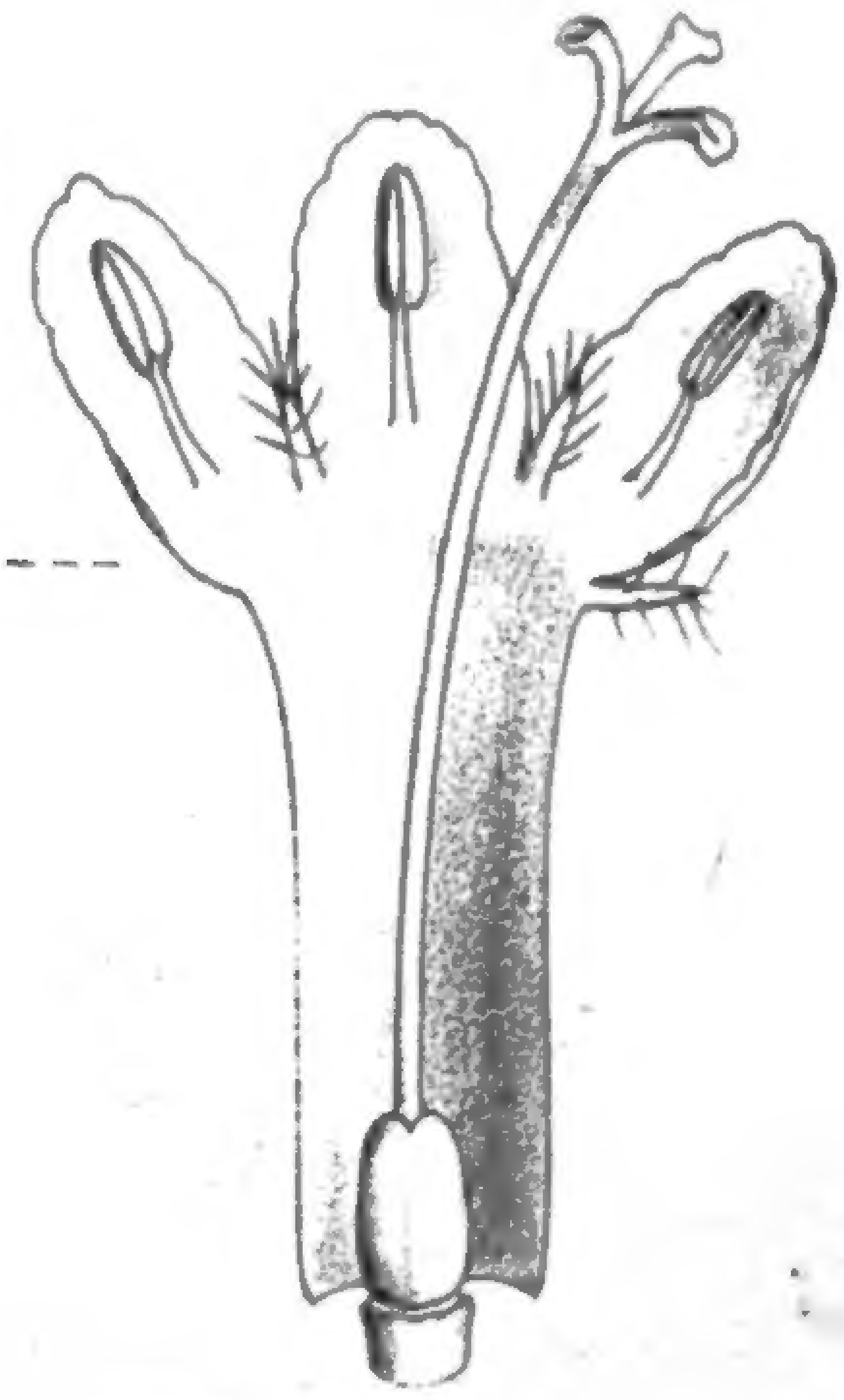
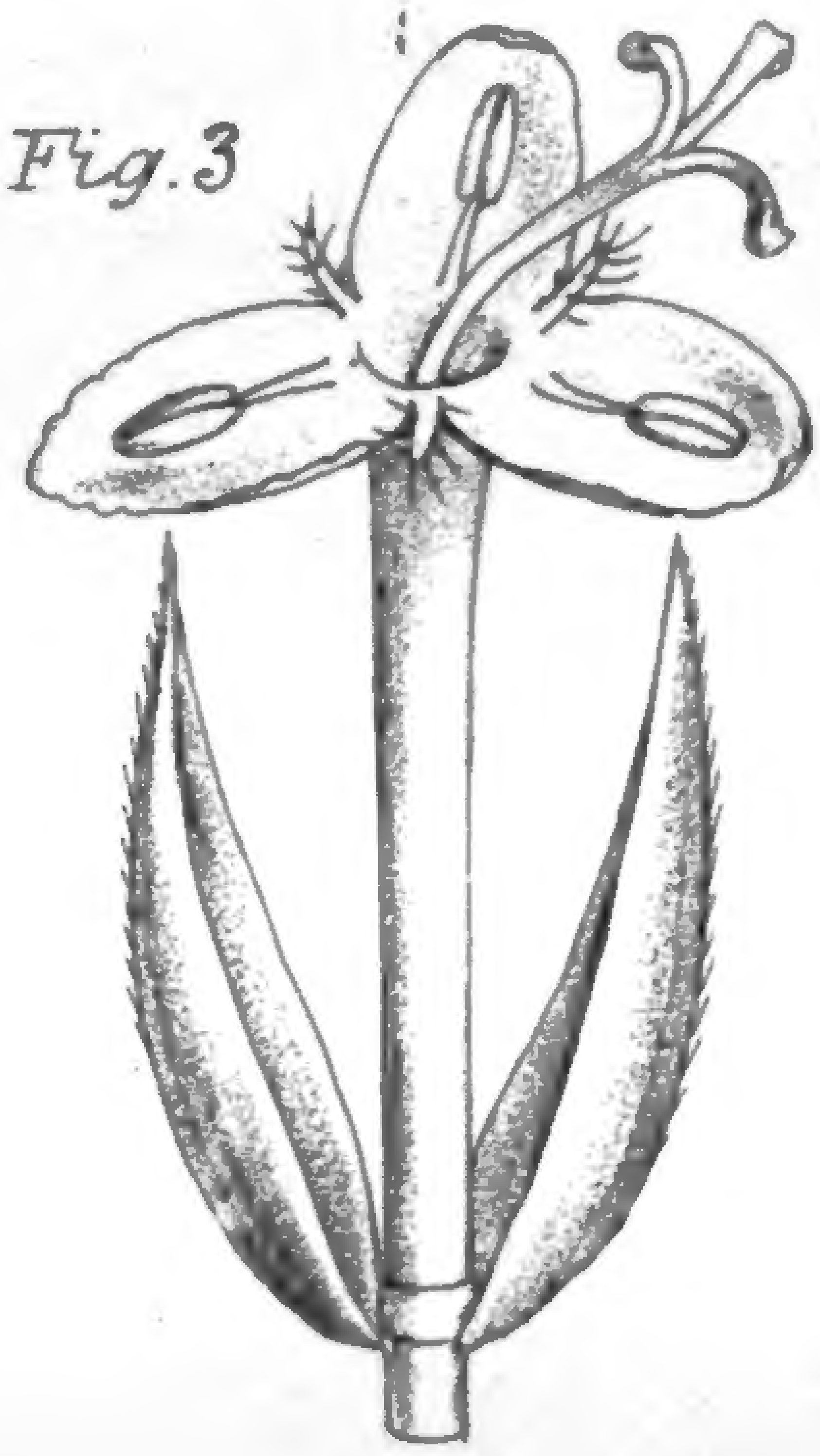
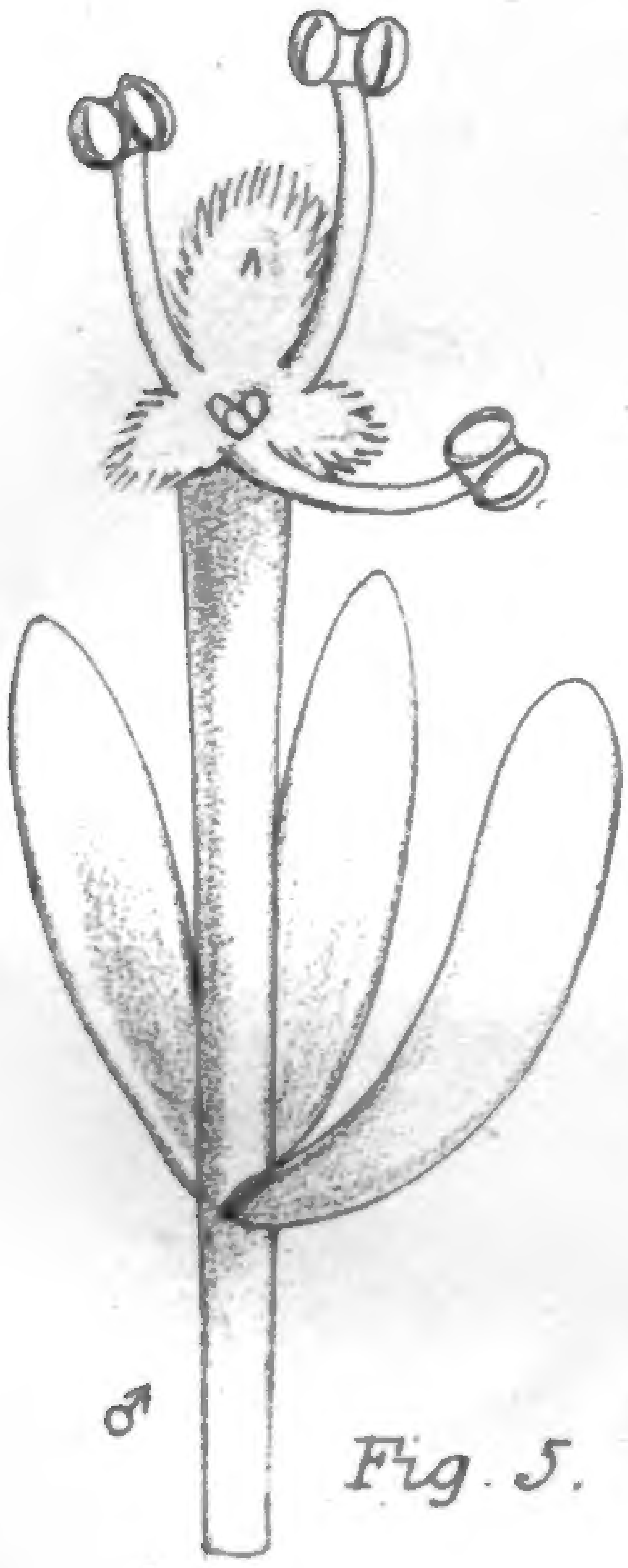


Fig. 4

Fig. 3





♂ Fig. 5.

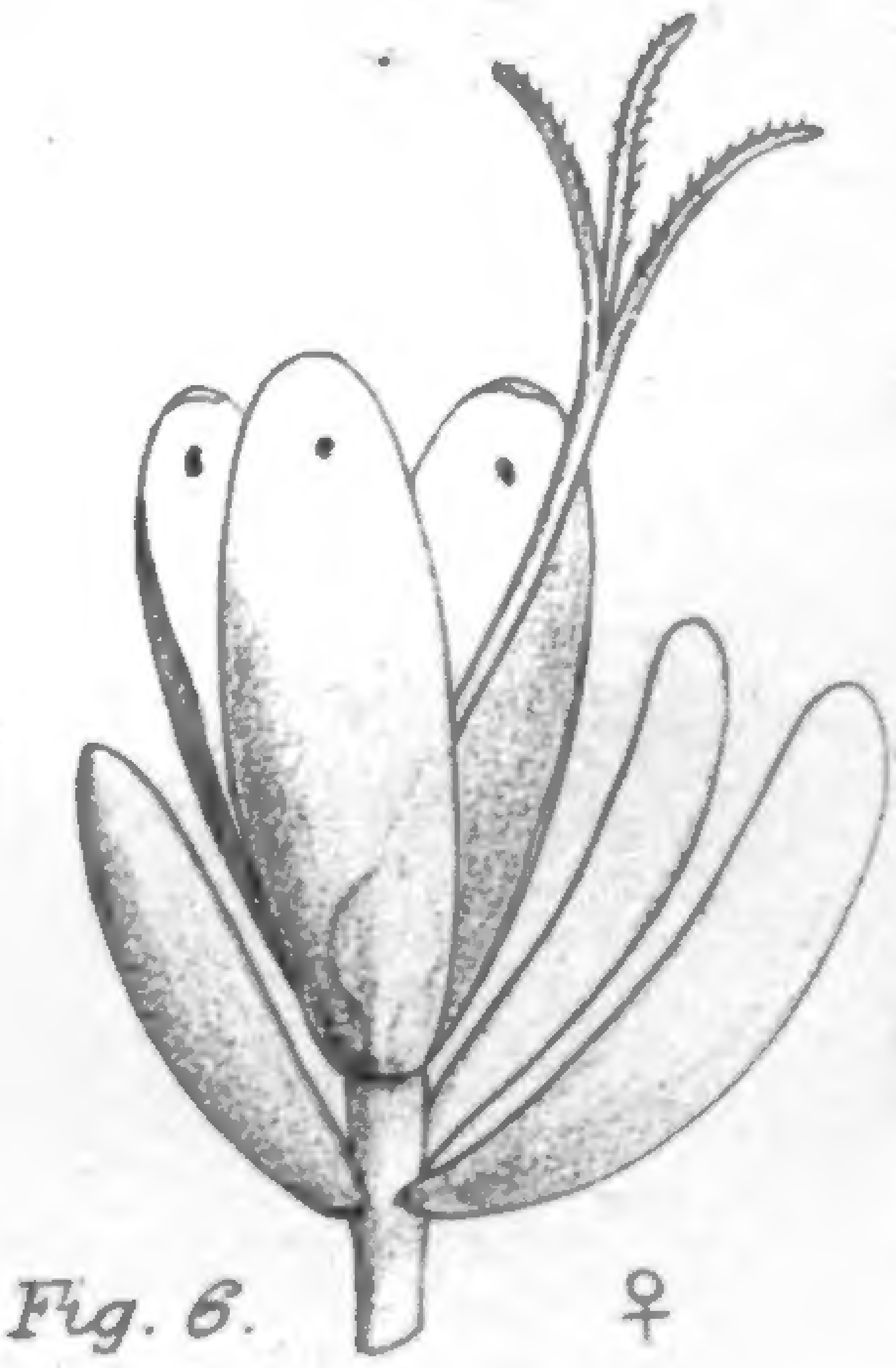
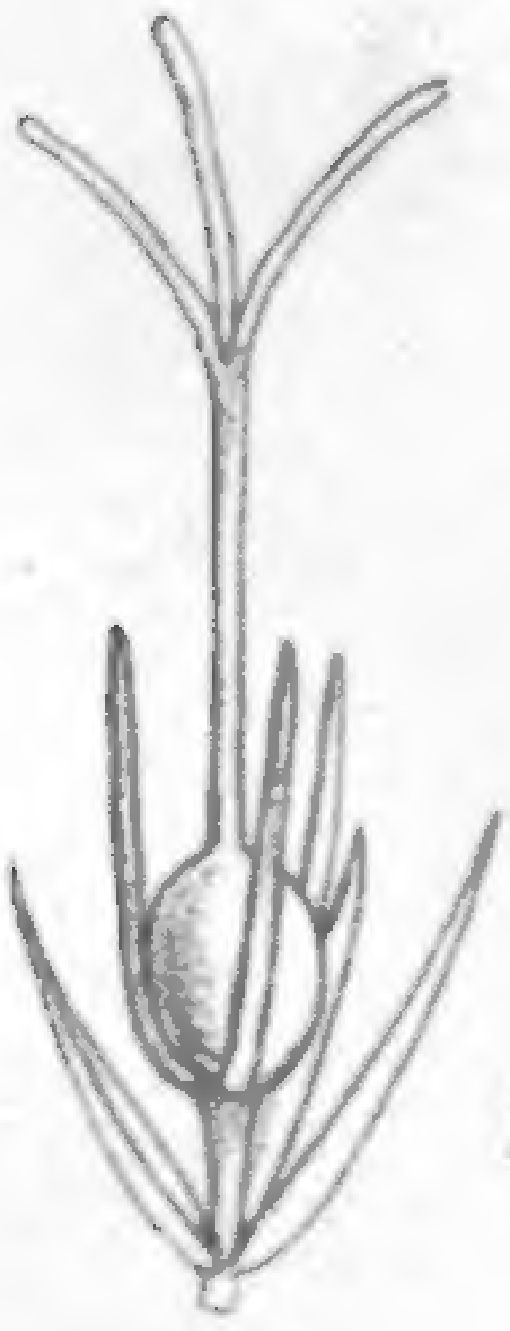
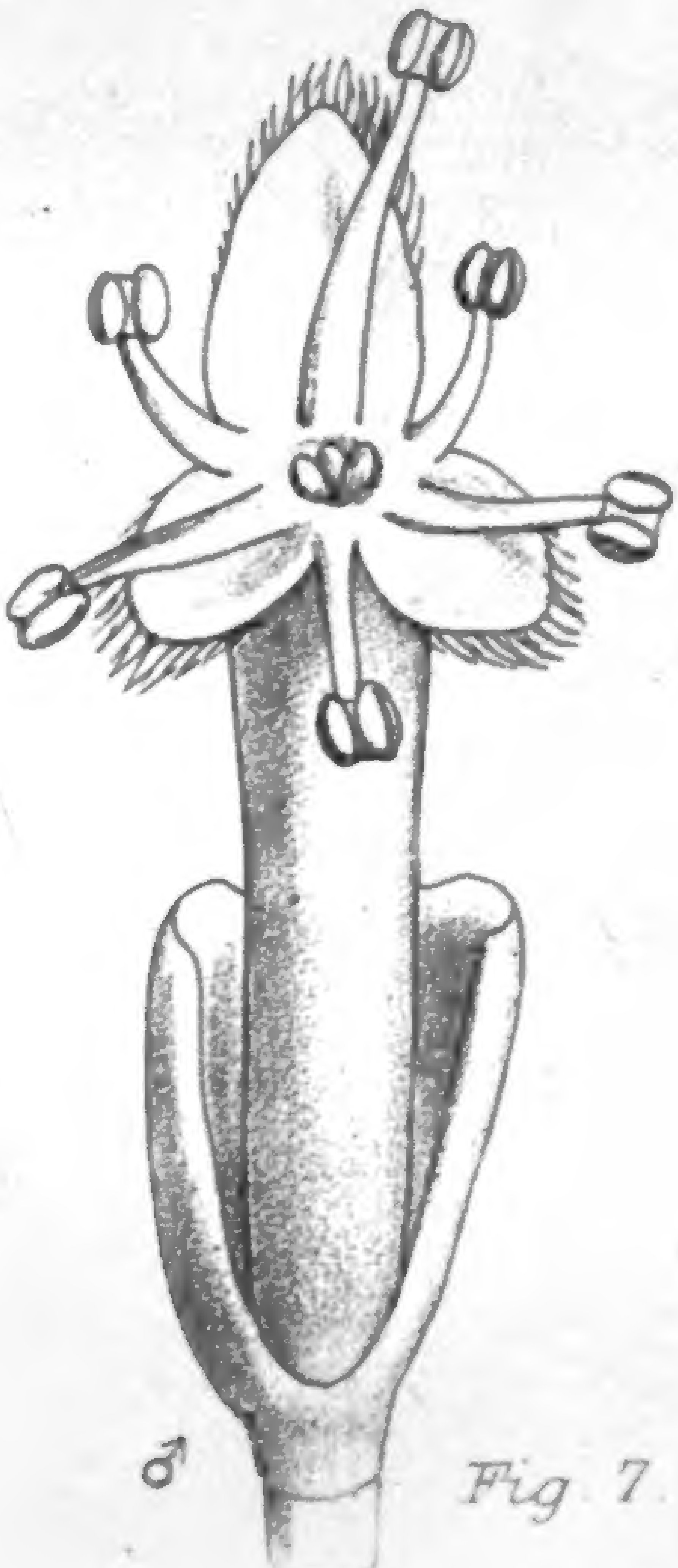


Fig. 6. ♀

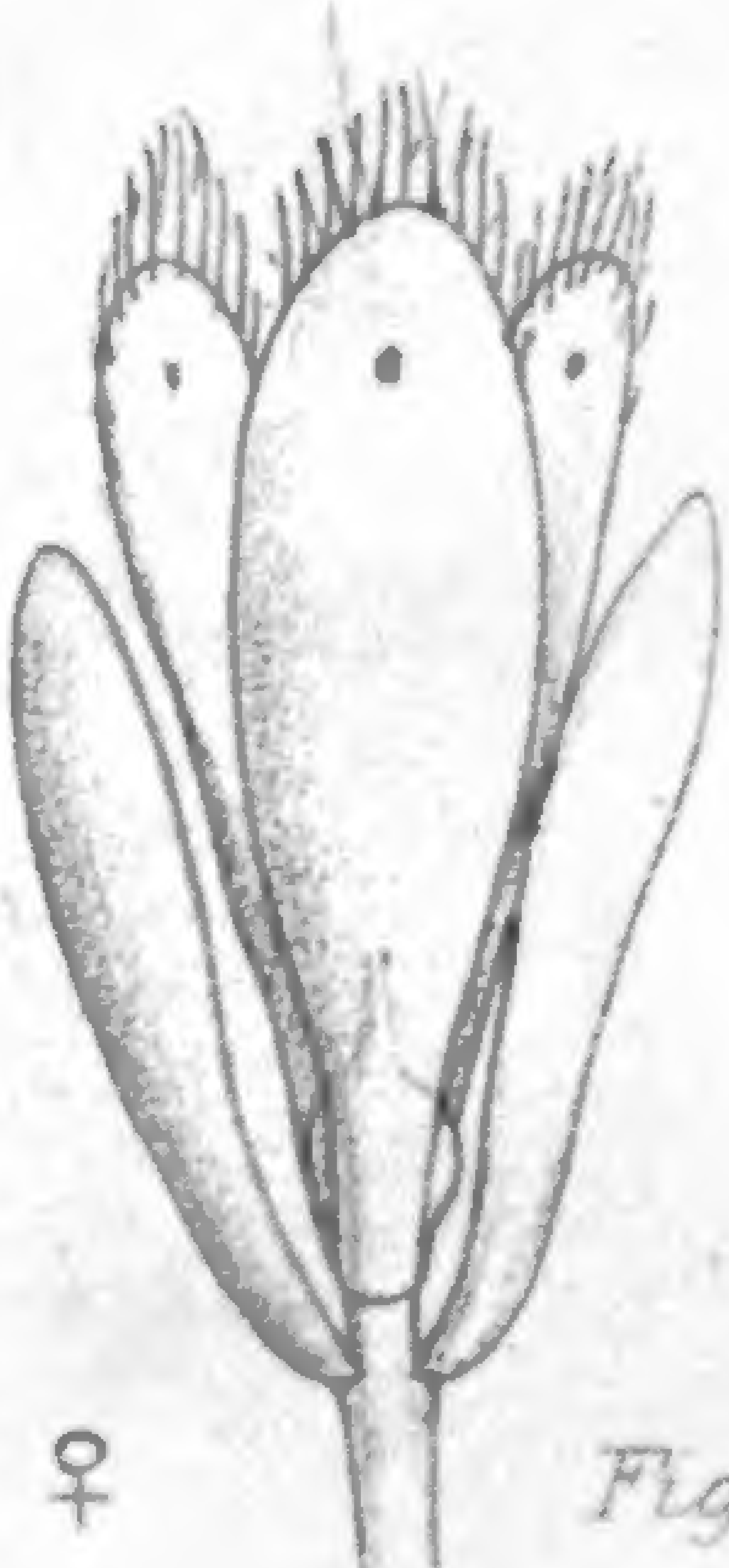
Fig. 9.



♀



♂ Fig. 7.



♀ Fig. 8

J. N. Fitch, lith.

Fitch, imp.

XYRIS. & ERIOCAULON

Fig. 1
Fig. 2
Fig. 4
p
Fig. 3
d
Fig. 5
Fig. 7
Fig. 6
Fig. 8
Fig. 9

J. N. Fitch lith.
Fitch imp.

CYPERACEÆ

G. Bentham.

Linn. Soc. Journ. Bot. Vol. XV. Pl. IX.

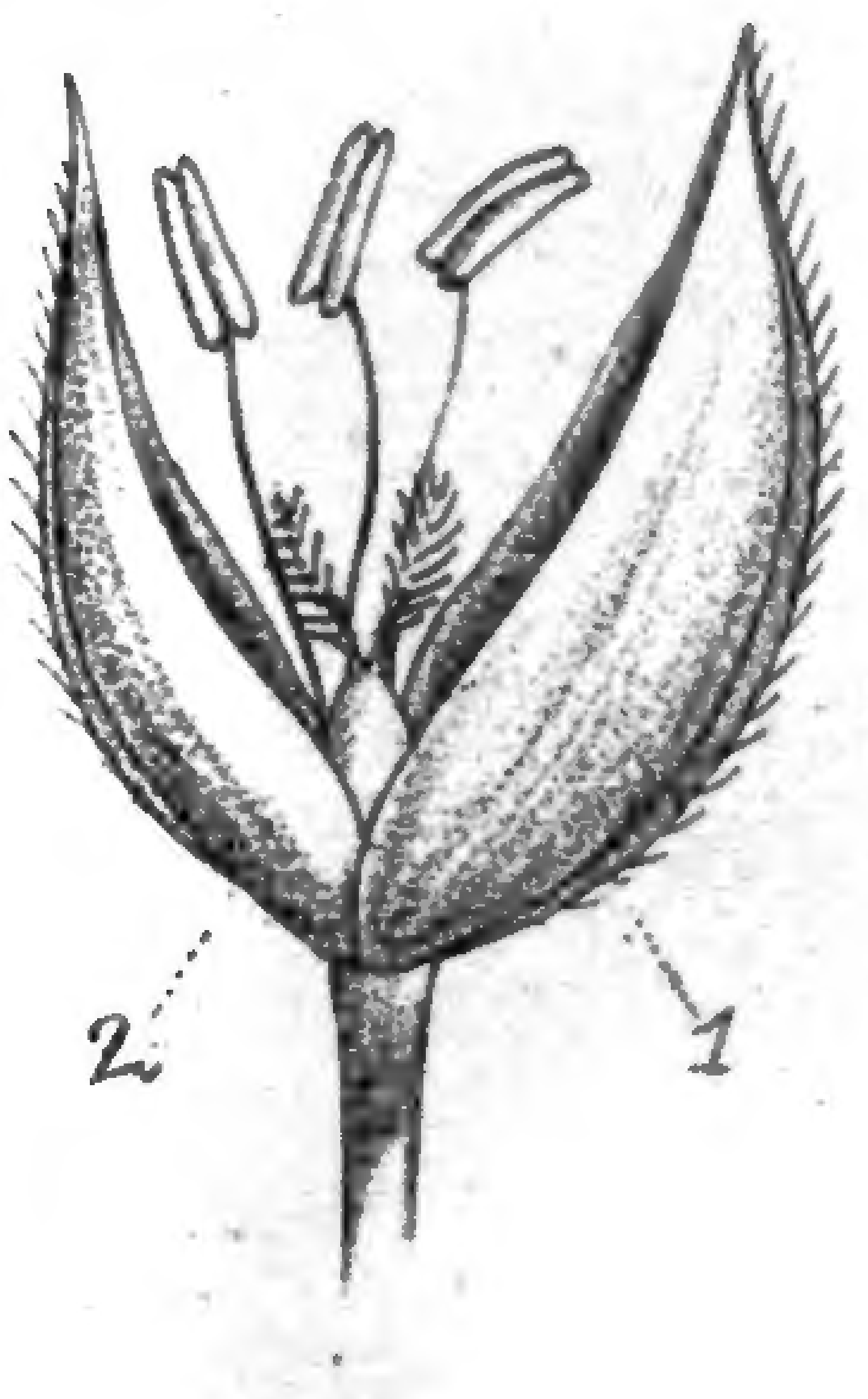


Fig. 1

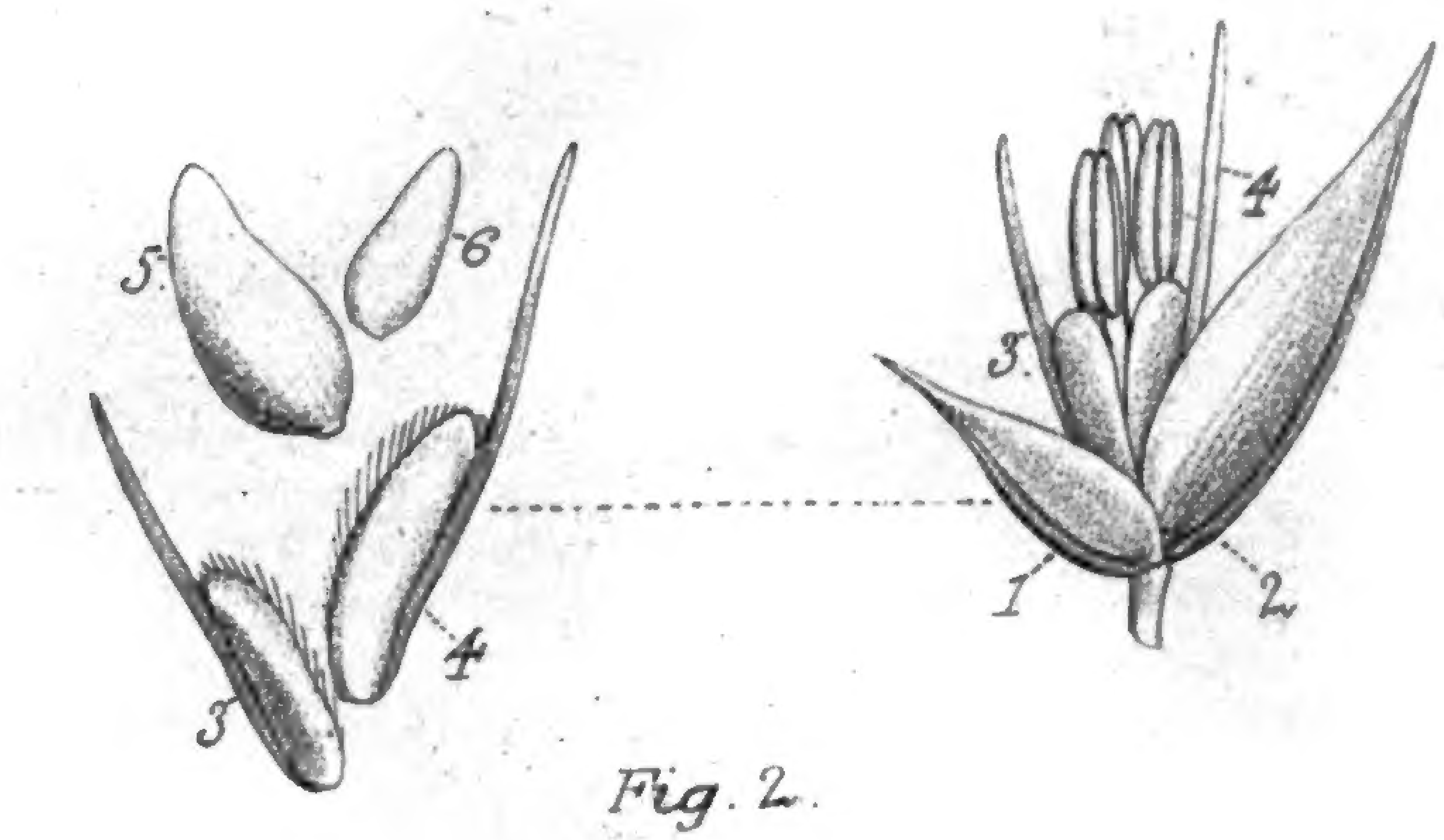
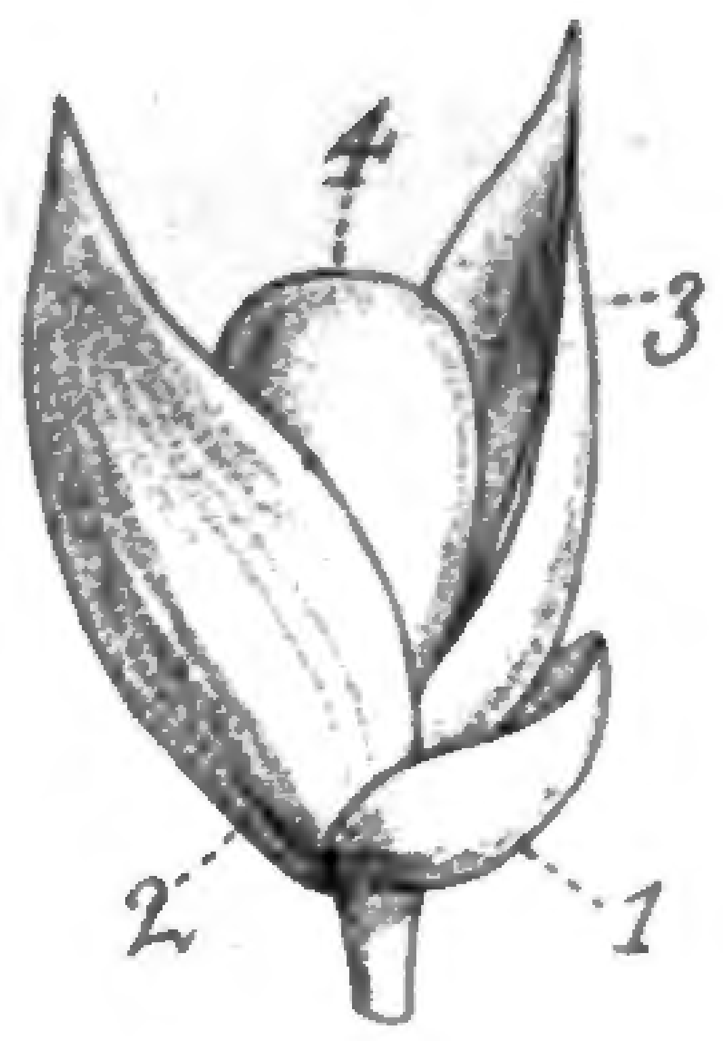


Fig. 2.

Fig. 3.



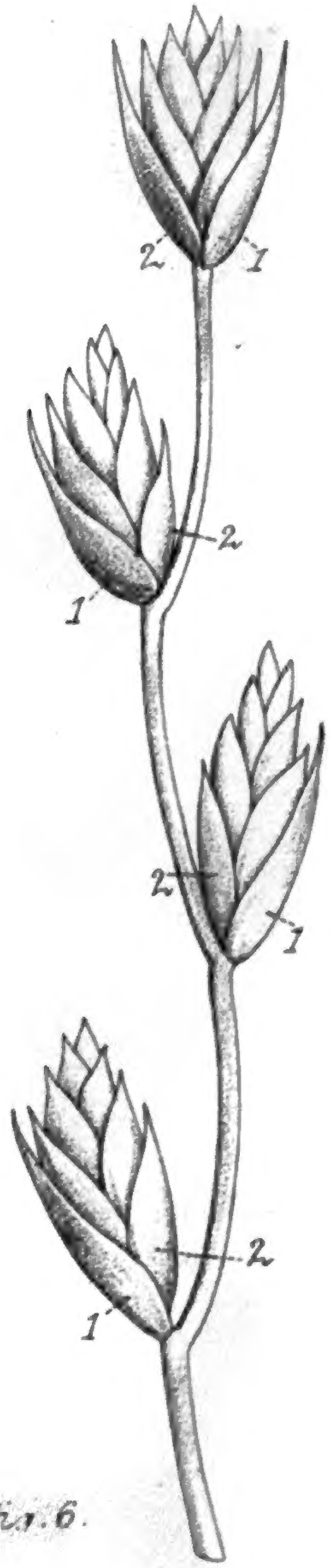


Fig. 6.

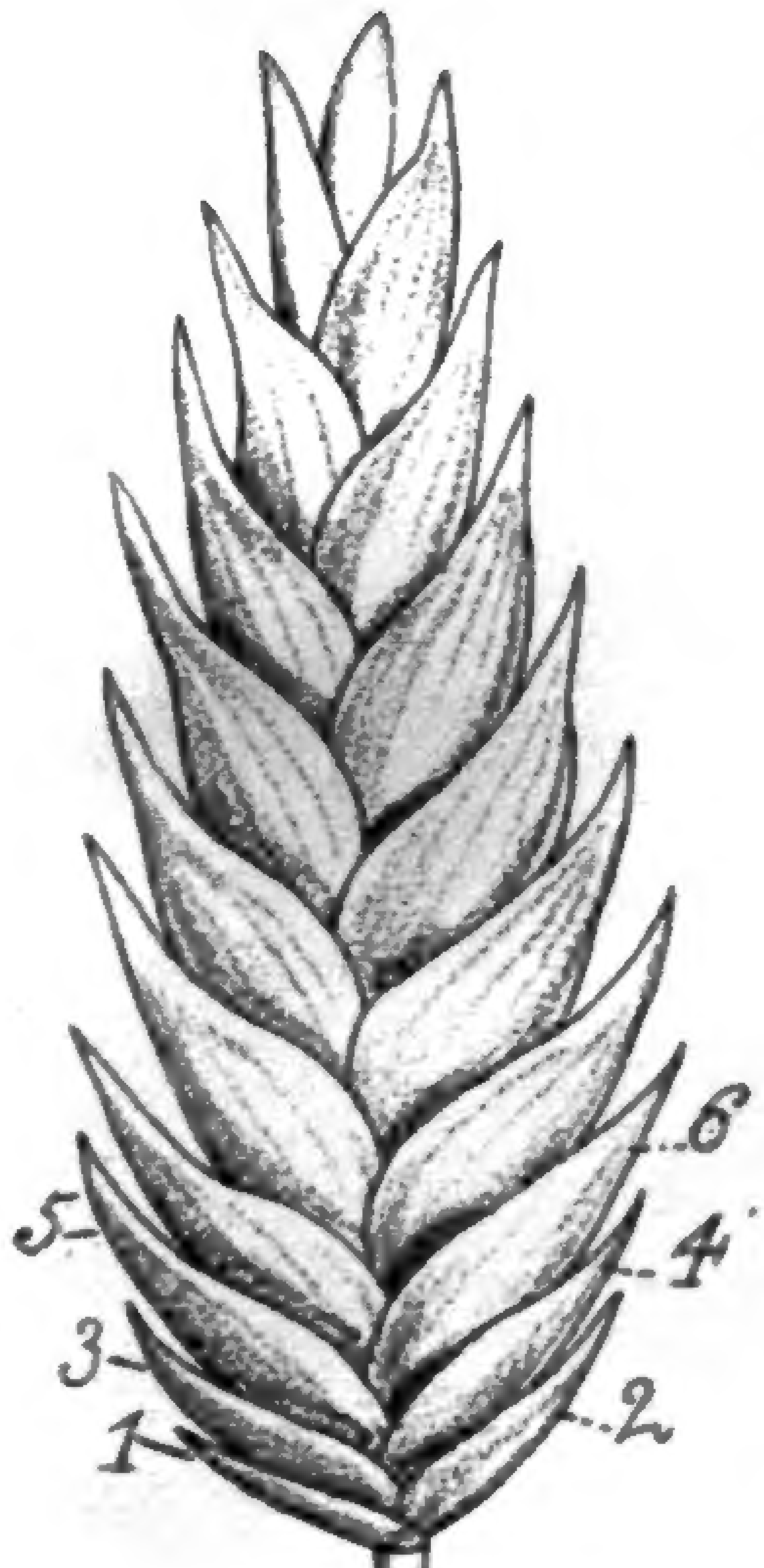


Fig. 4.

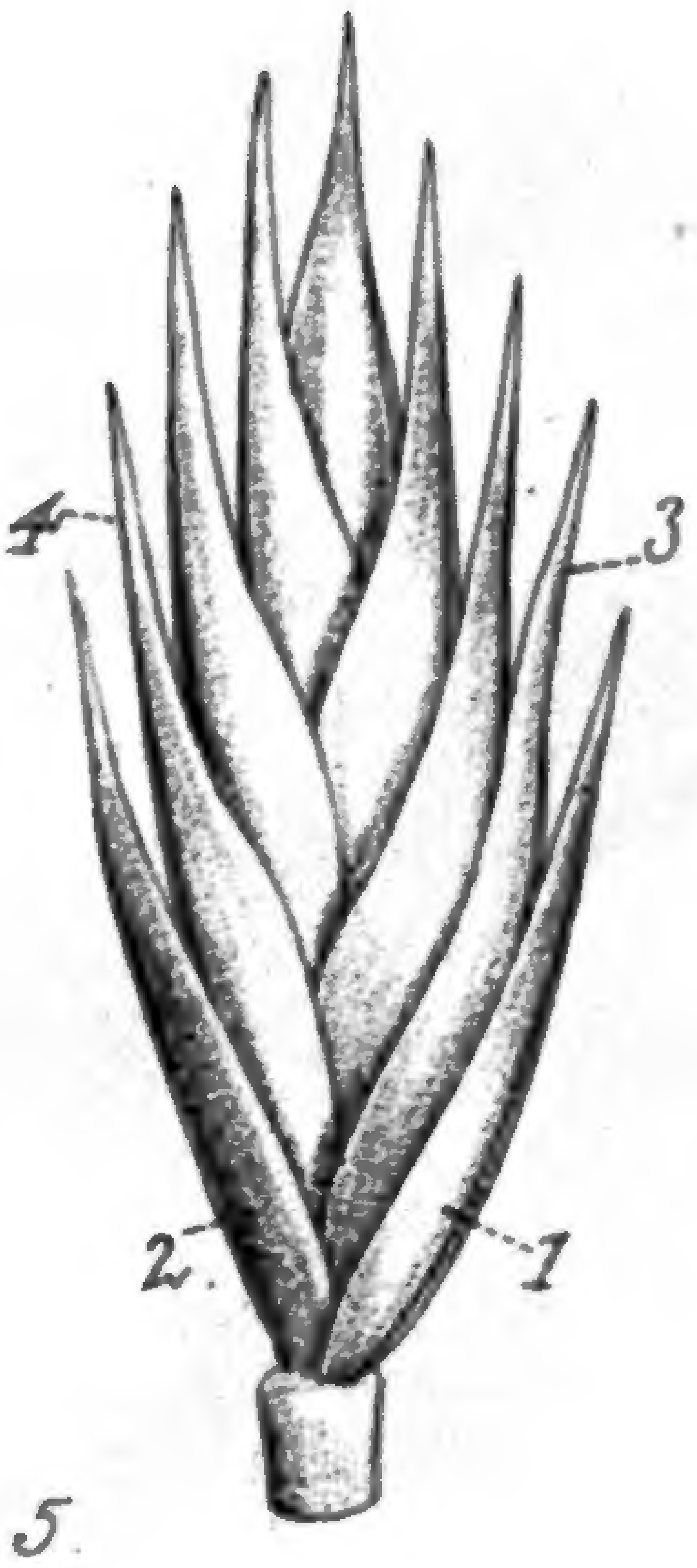


Fig. 5.

J.N. Fitch lith.

Fitch, imp.

GRAMINEÆ.